ISSN #1941-7519 (printed)
#1941-7527 (online)

Opuscula Philolichenum

Issue Spanning: January – December 2025
VOLUME 24

Published by J.C. Lendemer
Old Chatham, New York, U.S.A.

Opuscula Philolichenum

small works in the field of lichenology

EDITOR:

JAMES C. LENDEMER

Department of Botany
Research and Collections
The New York State Museum
222 Madison Ave., Albany, NY 12230, U.S.A.
e-mail: james.lendemer@nysed.gov

ASSOCIATE EDITOR:

CALEB A. MORSE

R.L. McGregor Herbarium
Division of Botany
Biodiversity Research Center, University of Kansas
2045 Constant Ave., Lawrence, KS 66047, U.S.A.
e-mail: cmorse@ku.edu

MISSION

Opuscula Philolichenum is intended to serve as a venue for the publication of small works in the field of lichenology (including lichenicolous fungi and non-lichenized fungi traditionally treated with lichens). The central goal of the journal is to provide timely publication, in a professional format, free of charge to authors and readers. While the journal focuses on topics relating to the lichen biota of North America this is by no means exclusive and manuscripts on other topics will be considered as the table of contents of the present issue clearly illustrates.

Authors wishing to submit a manuscript for publication in *Opuscula Philolichenum* should contact the editor prior to submission to confirm that the paper conforms to the mission of the journal (outlined above). Manuscript submissions should be left unformatted and authors should consult a recent issue of *Opuscula Philolichenum* for style. All submissions are subjected to review by at least two peer reviewers and, following acceptance are formatted by the editor.

NOTICE FROM THE EDITOR

When this journal began publication ten years ago it was among the first serials to take advantage of the internet when publishing new botanical nomenclatural acts. The journal was conceived as a primarily electronic one, available on-line free of charge (at http://sweetgum.nybg.org/philolichenum/), with a limited print run to satisfy the requirements for effective publication established under the *International Code for Botanical Nomenclature*. Since that time we have continued to publish the journal in this manner, printing one or two issues a year, with each issue consisting of between one and two hundred pages.

In 2004 we could not have foreseen the revolutionary changes that took place at the 18th International Botanical Congress in Melbourne. There the Nomenclature Section voted to allow electronic only publication of new nomenclatural acts beginning 1 January 2012. In response to this change *Opuscula Philolichenum* no longer produces hardcopy.

Beginning with volume number 12 of *Opuscula Philolichenum*, manuscripts are published electronically on-line in PDF/A format immediately following the approval of the authors in the post-review proof stage. The PDF issued online is considered to be the final version (= version of record) and the date on which the PDF is posted is considered to be the date of effective publication. In order to aid future workers the date of effective publication for each manuscript is provided in the table of contents. When a new manuscript is published online a record is also simultaneously transmitted to the organizers of *Recent Literature on Lichens* for inclusion in that database.

Table of Contents

Front Matter

i-iv.

effectively published online 18 February 2025:

Zhurbenko, M.P.
A new species of *Muellerella* from the Russian Arctic, with a key to the lichenicolous species of the genus.

1–7.

effectively published online 8 March 2025:

Zhurbenko, M.P.
Lichenicolous fungi of the Russian Meta-arctic: Detectability, regional activity, and an annotated catalogue.

8–114.

effectively published online 26 June 2025:

Zhurbenko, M.P. and A.K. Ezhkin
Some noteworthy lichenicolous fungi on *Lobaria* and *Ricasolia* from the Sakhalin Region of Russia.

115–126.

effectively published online 2 September 2025:

Brinker, S.R.
Contributions to the Ontario biota of lichens and allied fungi, with emphasis on the Great Lakes Basin: Recent collections from the Carolinian Zone.

127–156.

Opuscula Philolichenum, **24**: 1–7. 2025.
**pdf effectively published online 18February2025 via (http://sweetgum.nybg.org/philolichenum/)*

A new species of *Muellerella* from the Russian Arctic, with a key to the lichenicolous species of the genus

MIKHAIL P. ZHURBENKO [1]

ABSTRACT. – *Muellerella sibirica*, a lichenicolous ascomycete growing on *Bryobilimbia fissuriseda*, is described as new to science from the Arctic. The species is characterized by the comparatively large (mainly 150–200 µm in diam.), often almost sessile ascomata, up to 128-spored asci, and (0–)1(–3)-septate ascospores, (5–)6.5–9.5(–12.5) × (3–)3.5–4.5(–6) µm. A key to the 15 lichenicolous species of *Muellerella* is provided.

KEYWORDS. – Asia, Eurotiomycetes, lichen-dwelling fungi, Russia, taxonomy.

INTRODUCTION

The genus *Muellerella* Müll. Arg. (Chaetothyriales, Eurotiomycetes), typified with *M. polyspora* Müll. Arg., was established by Müller (1862). As circumscribed by Triebel and Keinz (2004), it includes ascomycetes with perithecioid ostiolate ascomata, persistent periphyses, evanescent interascal filaments, hemiamyloid hymenial gel, 16-spored to more than 100-spored asci of the *Verrucaria*-type, and brown, 0–3-septate, smooth or verruculose ascospores without a gelatinous sheath. Muggia et al. (2015) suggested an anamorph-teleomorph relationship for *M. atricola* (Linds.) Sacc. & D. Sacc. and *Lichenodiplis lecanorae* (Vouaux) Dyko & D. Hawksw. As shown by molecular studies, *Muellerella* is polyphyletic (Muggia et al. 2019) and thus its delimitation is likely to be revised. Currently, *Muellerella* includes 14 lichenicolous species and two bryophilous species, *M. frullaniae* Döbbeler & Triebel and *M. rubescens* Döbbeler & Triebel (Döbbeler & Triebel 1985).

During study of the lichen flora of the Siberian Arctic, I discovered a species of *Muellerella* that was morphologically very different from any known species of this genus and growing on an unusual host lichen. This contribution formally describes the material as a new species of *Muellerella* and presents an identification key for the lichenicolous species of this genus.

MATERIALS AND METHODS

This study is based on two collections from the Russian Arctic deposited in the herbaria BR and LE. Microscopy was carried out and images were captured using a Zeiss Axio Zoom V16 stereomicroscope fitted with an AxioCam 712 colour digital camera, and a Zeiss Axio Imager A1 compound microscope equipped with Nomarski differential interference contrast optics and fitted with an AxioCam 807 colour digital camera. Microscopic characters were studied using sections hand-cut with a razor blade and mounted in water, 10% potassium hydroxide (K), Lugol's iodine directly (I) or after K pretreatment (K/I), or phloxine. Measurements refer to water mounts. When the number of measurements (n) > 10, the dimensions of structures, as well as the length/width ratio (l/w) of the ascospores, are given as (min–)($\bar{x}$ – SD) – ($\bar{x}$ + SD)(–max), where min and max are the extreme values observed, $\bar{x}$ the arithmetic mean, and SD the corresponding standard deviation. Dimensions of the microstructures, both newly obtained and taken from the literature, were rounded to the nearest 0.5 µm.

[1]MIKHAIL P. ZHURBENKO – Laboratory of Systematics and Geography of Fungi, Komarov Botanical Institute, Russian Academy of Sciences, Professor Popov Street 2B, St Petersburg, 197022, Russia. – email: zhurb58@gmail.com – ORCID: 0000-0002-9839-4698.

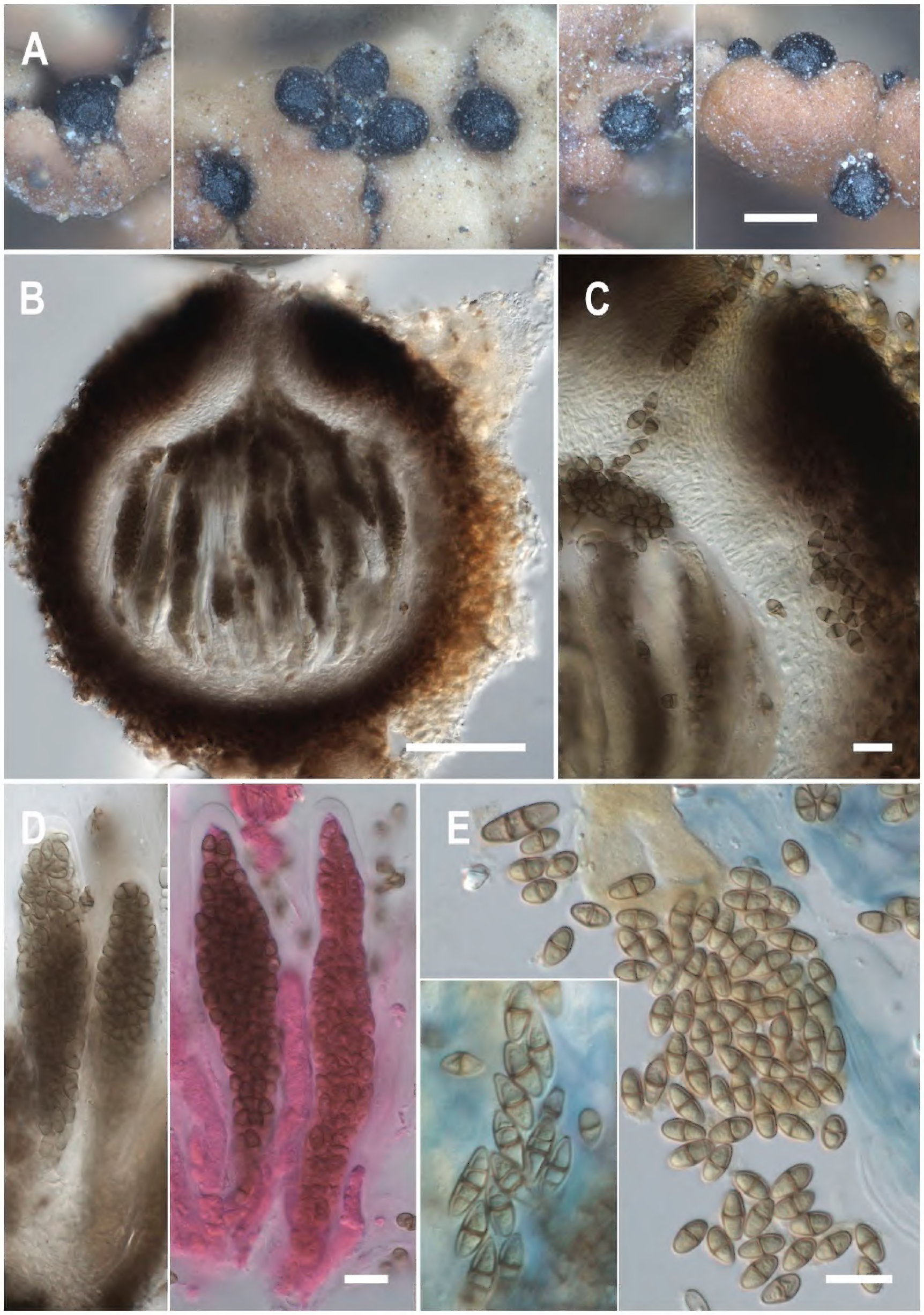

Figure 1, *Muellerella sibirica* (all from the holotype). **A,** habitus of ascomata. **B,** ascoma in cross section, in water. **C,** periphysoids and periphyses, in I. **D,** asci, in water (left) and phloxine (right). **E,** ascospores, in K/I. Scales: A = 200 µm, B = 50 µm, C–E = 10 µm.

THE NEW SPECIES

***Muellerella sibirica* Zhurb., sp. nov.**
Mycobank #857569.

FIGURE 1.

Distinguished from *Muellerella atricola* mainly by the (0–)1(–3)-septate vs (0–)1-septate, larger ascospores, 5–12.5 × 3–6 µm vs 6–7.5 × 3–4 µm, and a different host selection, *Bryobilimbia* (Lecideales) vs *Tephromela* (Lecanorales).

TYPE: RUSSIA. KRASNOYARSK TERRITORY: Taimyr Peninsula, Byrranga Mts., N of Levinson-Lessing Lake, 74°31′N, 98°36′E, elev. 200 m, arctic tundra, sandstone rock outcrops along the side of Skalistyi Creek valley, 26.viii.1995, on *Bryobilimbia fissuriseda* (thallus), *M.P. Zhurbenko 95623a* (LE F-355142a!, holotype; BR!, isotype).

ETYMOLOGY. – The epithet refers to Siberia, where the type was collected.

DESCRIPTION. – Vegetative hyphae not observed. *Ascomata* perithecia, abundant, black, slightly glossy, rough, subglobose, occasionally slightly applanate at the apex, (100–)150–200(–230) µm in diam. (n = 79), ¼ protruding to often almost sessile, arising singly or sometimes fused up to five together; ostiolar depression only occasionally distinct, up to 25 µm in diam., ostiolar region not wrinkled. *Exciple* 20–30 µm thick, slightly thicker above, in cross section composed of isodiametric or tangentially elongated (especially in the inner layers) cells, 4–10 × 2–4.5 µm, with wall 1–2.5 µm thick, the outer 4–7 layers of which have brown to dark brown walls and the inner 2–4 layers are colourless; in surface view unevenly medium to dark brown, of textura angularis, composed of cells 3–11 µm in length, with darker walls 1–2.5 µm thick. *Hymenial gel* I+ dull red, K/I+ blue. *Periphysoids* abundantly developed in the upper part of the ascoma around the ostiole, hyaline, rounded and sometimes slightly widened at the apex, (4–)8–13(–15) × 1.5–3(–3.5) µm (n = 20), occasionally branched once, 0–1(–3)-septate; below, closer to the middle of the ascoma gradually passing into capitate outgrowths of its hyaline inner wall. *Internal periphyses* lining the ostiolar canal, similar to periphysoids. *External periphyses* sometimes present, flanking the ostiole and protruding outwards, hyaline to pale brown, similar in structure to periphysoids, 11–18.5 × 1.5–3 µm. *Interascal hyphae* fairly well visible in some ascomata, scarce, filiform, 1.5–2.5 µm in diam., occasionally branched. *Asci* bitunicate, narrowly ellipsoid, occasionally fusiform or clavate, wall markedly thickened at the apex, without a distinct apical apparatus, (70–)73–94(–113) × (12.5–)15–23(–26) µm (n = 28), up to 128-spored (35–60 spores visible in optical section), I−, K/I− except for ascoplasm turning greyish yellow. *Ascospores* pale greyish brown, mainly ellipsoidal, occasionally broadly or narrowly ellipsoidal, ± rounded at the ends, (5–)6.5–9.5(–12.5) × (3–)3.5–4.5(–6) µm, l/w = (1.5–)1.8–2.4(–3.6) (n = 144), (0–)1(–3)-septate when mature (up to 5% of spores in mature asci are aseptate or 2–3-septate), with septa ca 0.5 µm thick, not constricted at the septa, with a smooth wall ca 0.5 µm thick, mostly arranged in 4–5 rows in the ascus. *Asexual morph* not observed.

DISTRIBUTION AND HOST. – The new species is known from two nearby collections made in Russia in the tundra zone of the Taimyr Peninsula in the Siberian Arctic. It was found growing on healthy-looking squamules of *Bryobilimbia fissuriseda* (Poelt) Timdal, Marthinsen & Rui (Lecideaceae, Lecideales), mostly along their edges, on their upper, and sometimes lower, side. This host lichen is known from scattered finds in the Holarctic, mainly in arctic and alpine environments, where it is confined to fissures in usually calciferous rocks (Timdal 1992). Pathogenic effects on the host were not observed.

DISCUSSION. – In addition to the new species, six other known lichenicolous species of *Muellerella* are characterized by asci with more than 64 ascospores that are also septate: *M. antarctica* Etayo, *M. atricola*, *M. lecanactidis* Diederich & van den Boom, *M. lichenicola* (Sommerf.) D. Hawksw., *M. thalamita* (Nyl.) D. Hawksw., F. Berger & LaGreca, and *M. vesicularia* (Linds.) D. Hawksw. Of these, four species have much smaller ascospores: *M. antarctica* (4–6.5 × 1.5–2 µm; Etayo & Sancho 2008), *M. atricola* (6–7.5 × 3–4 µm; Hafellner 2007), *M. lecanactidis* (3.5–5 × 1.5–2.5 µm; Diederich 2003), and *M. lichenicola* (4–8 × 2–3.5 µm; Triebel 1989, and additional measurements presented here). *Muellerella vesicularia* has much larger ascospores (12–15.5 × 5–7 µm) which are more often 3-septate (Hawksworth

1985). *Muellerella thalamita* differs in having much smaller perithecia (35–125 µm in diam.), much shorter asci (30–50 µm long), and narrower ascospores (2–4 µm wide) (Berger & LaGreca 2014). The two muscicolous species, *M. frullaniae* and *M. rubescens*, which parasitize liverworts, also have asci with more than 32 septate spores. However, these two species produce much narrower ascospores (2–3 µm wide; Döbbeler & Triebel 1985).

Although *Muellerella* species have been reported from various genera of Lecideales, *M. sibirica* is the first documented species of this genus on *Bryobilimbia* Fryday, Printzen & S. Ekman.

Previously, for example in Triebel (1989), the delimitation of *Muellerella lichenicola* included *M. atricola*. To correctly compare the dimensions of ascospores of the new species and *Muellerella lichenicola*, I examined specimens of the latter growing on its type host *Gyalolechia flavovirescens* (Wulfen) Søchting, Frödén & Arup) (Triebel 1989). These proved to be close to those given by Triebel (1989), viz. (4–)5–6.5(–8) × 2.5–3(–3.5) µm (n = 80) in the material examined for this study vs (4.5–)5–6(–7) × (2–)2.5–3(–3.5) µm as reported by Triebel (1989).

An identification key to the lichenicolous species of *Muellerella* is included here to contextualize the new species (see Appendix I).

Additional specimen of Muellerella sibirica *examined*. – **RUSSIA**. KRASNOYARSK TERRITORY: Taimyr Peninsula, Byrranga Mts, S of Levinson-Lessing Lake, 74°25′N, 98°48′E, elev. 50 m, arctic tundra, small calciferous rocks, 31.vii.1995, in rock fissures with fine gravel on *Bryobilimbia fissuriseda* (thallus), *M.P. Zhurbenko 95624a* (LE F-355143a).

Specimen of Muellerella lichenicola *examined for comparison*. – **MONGOLIA**. KHUVSGUL AIMAK: Altargana gol River, 9.vii.2018, on *Gyalolechia flavovirescens*, *O. Enkhtuya & S. Javkhlan s.n.* (LE 309646).

ACKNOWLEDGEMENTS

The research of M. P. Zhurbenko was carried out within the framework of the research project of the Komarov Botanical Institute of the Russian Academy of Sciences 'Taxonomic, ecological and structural-functional diversity of fungi and fungus-like protists' (124013100829-3) using the equipment of its Core Facility Center 'Cell and Molecular Technologies in Plant Science'. Wolfgang von Brackel and Paul Diederich are thanked for valuable comments on the manuscript. Einar Timdal helped to identify *Bryobilimbia fissuriseda*.

LITERATURE CITED

Alstrup, V. and A. Elvebakk. 1996. Part 5. Fungi III. Lichenicolous fungi. In: Elvebakk, A. and P. Prestrud (eds.) A catalogue of Svalbard plants, fungi, algae and cyanobacteria. Norsk Polarinstitutt Skrifter 198: 261–270.

Aptroot, A. and V. Alstrup. 1991. Lichens from Edgeoya, Svalbard. Graphis Scripta 3(2): 73–75.

Atienza, V., E. Araujo, M. R. Arroyo, A. R. Burgaz, G. Figueras, A. Gómez-Bolea, N. L. Hladun, X. Llimona, E. Llop, M. E. L. de Silanes, B. Marcos, I. Pérez-Vargas, R. Pino-Bodas, E. Seriñá and V. J. Rico. 2014. Lichenized and lichenicolous fungi from the Pitiüses Archipelago (Eivissa and Formentera Islands and Islets), Balearic Islands, Spain. Mycotaxon [unnumbered volume]: 1–36.

Berger, F. and S. LaGreca. 2014. Contributions to the lichen flora of Bermuda – Part I. New records, new combinations, and interesting collections of lichenized ascomycetes. Evansia 31: 41–68.

Brackel, W. von. 2014. Kommentierter Katalog der flechtenbewohnenden Pilze Bayerns. Bibliotheca Lichenologica 109: 1–476.

Brackel, W. von. 2023. Weitere Funde von *flechtenbewohnenden* Pilzen in Bayern – Beitrag zu einer Checkliste VIII. Archive for Lichenology 35: 1–22.

Diederich, P. 2003. Neue Arten und neue Funde von amerkanischen lichenicolen Pilzen. Herzogia 16: 41–90.

Diederich, P., J. D. Lawrey and D. Ertz. 2018. The 2018 classification and checklist of lichenicolous fungi, with 2000 non-lichenized, obligately lichenicolous taxa. The Bryologist 121: 340–425.

Döbbeler, P. and D. Triebel. 1985. Hepaticole Vertreter der Gattungen *Muellerella* and *Dactylospora* (Ascomycetes). Botanische Jahrbücher für Systematik Pflanzengeschichte und Pflanzengeographie 107: 503–519.

Etayo, J. 2010. Líquenes y hongos liquenícolas de Aragón. Guineana 16: 1–501.

Etayo, J. and L. G. Sancho. 2008. Hongos liquenícola del Sur de Sudamérica, especialmente de Isla Navarino (Chile). Bibliotheca Lichenologica 98: 1–302.

Hafellner, J. 2007. The lichenicolous fungi inhabiting *Tephromela* species. Bibliotheca Lichenologica 96: 103–128.

Hafellner, J. 2021. Lichenicolous Biota (Nos 341–360). Fritschiana 97: 1–17.

Hafellner, J. and W. Obermayer. 2007. Flechten und lichenicole Pilze im Gebiet der Stubalpe (Österreich: Steiermark und Kärnten). Mitteilungen des naturwissenschaftlichen Vereins der Steiermark 136: 5–59.

Halıcı, M., D. L. Hawksworth and A. Aksoy. 2007. New and interesting lichenicolous fungi records from Turkey. Nova Hedwigia 85(3–4): 393–401.
Hawksworth, D. L. 1975. Notes on British lichenicolous fungi, I. Kew Bulletin 30: 183–203.
Hawksworth, D. L. 1985. A redisposition of the species referred to the ascomycete genus *Microthelia*. Bulletin of the British Museum (Natural History), Botany Series 14: 43–181.
Kukwa, M. and A. Flakus. 2009. New or interesting records of lichenicolous fungi from Poland VII: species mainly from Tatra Mountains. Herzogia 22: 191–211.
Muggia, L., T. Kopun and D. Ertz. 2015. Phylogenetic placement of the lichenicolous, anamorphic genus *Lichenodiplis* and its connection to *Muellerella*-like teleomorphs. Fungal Biology 119(11): 1115–1128.
Muggia, L., S. Pérez-Ortega and D. Ertz. 2019. *Muellerella*, a lichenicolous fungal genus recovered as polyphyletic within Chaetothyriomycetidae (Eurotiomycetes, Ascomycota). Plant and Fungal Systematics 64(2): 367–381.
Müller, J. 1862. Principes de classification des lichens et énumeration des lichens de Genève. Mémoires de la Société de Physique et d'Histoire Naturelle de Genève 16(2): 343–433.
Roux, C. 2020. Catalogue des lichens et champignons lichénicoles de France métropolitaine, 3e édition revue et augmentée (2020). Association française de lichénologie (AFL), Fontainebleau. 1341 pp.
Roux, C., Y. Brien, J.-Y. Monnat and A. Gardiennet. 2022. *Muellerella solenopsorae* Brien, Cl. Roux et Monnat sp. nov., champignon lichénicole (Ascomycota) sur *Solenopsora holophaea*. Bulletin de la Société Linnéenne de Provence 73: 37–42
Santesson, R., R. Moberg, A. Nordin, T. Tønsberg and O. Vitikainen. 2004. Lichen-forming and lichenicolous fungi of Fennoscandia. Museum of Evolution, Uppsala University. 359 pp.
Suija, A., P. Czarnota, D. Himelbrant, I. Juriado, M. Kukwa, P. Lohmus and J. Motiejūnaitė. 2009. New Estonian records: lichenized and lichenicolous fungi. Folia Cryptogamica Estonica 46: 83–88.
Timdal, E. 1992. The distribution of *Mycobilimbia fissuriseda*. Graphis Scripta 3: 115–117.
Triebel, D. 1989. Lecideicole Ascomyceten. Eine Revision der obligat lichenicolen Ascomyceten auf lecideoiden Flechten. Bibliotheca Lichenologica 35: 1–278.
Triebel, D. and C. Kainz. 2004. *Muellerella*. In: Nash III, T. H, B. D. Ryan, P. Diederich, C. Gries and F. Bungartz (eds.). Lichen Flora of the Greater Sonoran Desert Region, Vol. 2. Lichens Unlimited, Arizona State University, Tempe, Arizona, pp. 673–675.
van den Boom, P. and J. Etayo. 2014. New records of lichenicolous fungi and lichenicolous lichens from the Iberian Peninsula, with the description of four new species and one new genus. Opuscula Philolichenum 13: 44–79.
Vouaux, L. 1913. Synopsis des champignons parasites de lichens. Bulletin de la Société Mycologique de France 29(1): 33–128.
Zhurbenko, M. P. 2009a. Lichenicolous fungi and some lichens from the Holarctic. Opuscula Philolichenum 6: 87–120.
Zhurbenko, M. P. 2009b. Lichenicolous fungi and lichens from the Holarctic. Part II. Opuscula Philolichenum 7: 121–186.

APPENDIX I: KEY TO THE LICHENICOLOUS SPECIES OF *MUELLERELLA*

The key below is based on the data from the present paper and literature cited within each entry as "Lit.". Literature sources with any taxonomic information are in bold. Since ascospores with more than one septa are rare in *Muellerella sibirica*, it is also presented in the key among species with (0–)1-septate ascospores. Because the exact number of spores per ascus in *M. thalamita* was not specified in the original publication, it is included in the key both among species characterized by asci with up to 64 spores and by asci with more than 64 spores.

1. Ascospores aseptate 2
1. Ascospores septate 4
    2. Ascospores 2.5–3.5 × 2–2.5 µm; on apothecia of corticolous *Bacidia fraxinea*, *B. rubella* (type host), *Biatora* sp., and *Lecania fuscellata*. Lit.: **Hawksworth (1975)**, Roux (2020), Santesson et al. (2004) ..... *M. hospitans* Stizenb.
    2. Ascospores ≥ 5 µm long 3
        3. Ascospores narrowly ellipsoid to ellipsoid, 5–7 × 2–3.5 µm; type on a corticolous crustose lichen, mainly on *Arthonia radiata* and *Opegrapha atra*, but also reported on *Aspicilia elevata*, *Caloplaca cerina*, *Miriquidica subplumbea*, and *Verrucaria* sp. Lit.: Alstrup & Elvebakk (1996), Aptroot & Alstrup (1991), **Hawksworth (1975)**, **Müller (1862)**, Roux (2020), Triebel (1989), Santesson et al. (2004), Suija et al. (2009) ..... *M. polyspora* Müll. Arg.
        3. Ascospores globose, 5–7 µm in diam., or subglobose, 5–7 × 5 µm; a poorly understood species on *Sticta sylvatica*. Lit.: **Vouaux (1913)** ..... *M. stictinae* (H. Olivier) Vouaux
            4. Some ascospores 2–3-septate 5

4. Ascospores consistently 0–1-septate 7
5. Ascospores 12–15.5 × 5–7 µm, 1–3-septate; mainly on *Thalloidima rosulatum* and *T. sedifolium* (type host), but also reported on *Lecidea fuscoatra* and *Romjularia lurida*. Lit.: Etayo (2010), Halıcı et al. (2007), **Hawksworth (1985)**, Roux (2020), van den Boom & Etayo (2014) ..... *M. vesicularia* (Linds.) D. Hawksw.
5. Ascospores ≤ 12.5 µm long 6
6. Asci up to 128-spored; perithecia 100–230 µm in diam., ¾-immersed to often almost sessile; ascospores 5–12.5 × 3–6 µm, (0–)1(–3)-septate; on *Bryobilimbia fissuriseda*. Lit.: **present paper** ..... *M. sibirica* Zhurb.
6. Asci up to 32-spored; perithecia 75–125 µm, immersed; ascospores 6–12.5 × 2.5–5 µm, (0–)1–3-septate; on *Solenopsora holophaea*. Lit.: **Roux et al. (2022)** ..... *M. solenopsorae* Brien, Cl. Roux & Monnat
7. Asci with up to 64 spores 8
7. Asci with more than 64 spores 12
8. Perithecia 35–125 µm in diam.; ascospores 5–10 × 2–4 µm; on apothecia of corticolous *Baculifera micromera*, *Hafellia disciformis*, and *Orcularia insperata* (type host). According to the literature cited here, ascospores are 'many per ascus', but their exact number is not stated. Lit.: **Berger & LaGreca (2014)** ..... *M. thalamita* (Nyl.) D. Hawksw., F. Berger & LaGreca
8. Perithecia mostly larger, ≥ 100 um in diam. 9
9. Asci mainly 20–30-spored; perithecia (150–)175–250(–350) µm in diam.; ascospores (7.5–)8–10(–13) × (3.5–)4–5(–6) µm; on lichens from different orders, type on *Lecidea lapicida*. Lit.: Brackel (2014), Hafellner (2021), Roux (2020), **Triebel (1989)** ..... *M. pygmaea* (Körb.) D. Hawksw.
9. Asci mainly 32–64-spored, ascospores mainly ≤ 8.5 µm long 10
10. Ostiolar region vertically wrinkled; perithecia 175–400 µm in diam.; asci 32(–64)-spored; ascospores dark brown, thick-walled, 6.5–8.5(–9) × 4–5.5(–6) µm; restricted to *Ophioparma ventosa* (type host), in the past also reported on many other hosts, such as *Aspicilia* sp., *Lecanora concolor*, *Miriquidica garovaglii*, *Protoparmelia badia*, and *Rhizocarpon* spp. Lit.: **Brackel** (2014, **2023**), Etayo (2010), **Hafellner & Obermayer (2007)**, Kukwa & Flakus (2009), Roux (2020), **Triebel (1989)**, Zhurbenko (2009a) ..... *M. ventosicola* (Mudd) D. Hawksw.
10. Ostiolar region more or less flattened, not wrinkled; perithecia ≤ 270 µm in diam.; ascospores pale to dark brown, thin- to thick-walled, mostly 3–4.5 µm wide 11
11. Asci 64-spored; perithecia 190–270 µm in diam.; ascospores medium to dark brown, thick-walled, (5.5–)6.5–7.5(–9) × (3–)3.5–4.5(–5) µm; on *Rhizocarpon geographicum* (type host) and *R. reductum*. Lit.: **Brackel (2023)** ..... *M. rhizocarpicola* Brackel
11. Asci (ca 20–)32–64-spored; perithecia 100–250 µm in diam.; ascospores pale to medium brown, thin- to thick-walled, (5.5–)6–8(–8.5) × (2.5–)3–4.5(–5) µm; on lichens from different orders, type on *Circinaria calcarea*. Lit.: Brackel (2014), Roux (2020), **Triebel (1989)** ..... *M. erratica* (A. Massal.) Hafellner & V. John
12. Ascospores 3.5–5 × 1.5–2.5 µm; perithecia 60–120 µm in diam.; asci ca 256-spored; on *Caloplaca skii*, *Cresponea premnea*, *Lecanora confusa*, *Lecania cyrtella*, and *Sigridea californica* (type host). Lit.: Atienza et al. (2014), **Diederich (2003)**, Diederich et al. (2018), Roux (2020) ..... *M. lecanactidis* Diederich & van den Boom
12. Some ascospores >5 µm long 13
13. Perithecia 35–125 µm in diam.; ascospores 5–10 × 2–4 µm; on apothecia of corticolous *Baculifera micromera*, *Hafellia disciformis*, and *Orcularia insperata* (type host). According to the literature cited here, ascospores are 'many per ascus', but their exact number is not stated. Lit.: **Berger & LaGreca (2014)** ..... *M. thalamita* (Nyl.) D. Hawksw., F. Berger & LaGreca
13. Perithecia 70–230 µm in diam., on different hosts 14

14. Asci probably 128–256-spored, ascospores 4–6.5 × 1.5–2 µm, perithecia 100–170 µm in diam., on *Hypogymnia antarctica* (type host) and *Pannoparmelia angustata*. Lit.: **Etayo & Sancho (2008)** .... *M. antarctica* Etayo

14. Asci up to 128-spored, ascospores ≥ 2 µm wide 15

15. Ascospores 5–12.5 × 3–6 µm, (0–)1(–3)-septate; perithecia 100–230 µm in diam.; on *Bryobilimbia fissuriseda*. Lit.: **present paper** ..... *M. sibirica* Zhurb.

15. Ascospores up to 8 µm long and 4 µm wide 16

16. Perithecia 150–200 µm in diam., ascospores 4–7.5 × 2.5–4 µm, on *Tephromela atra*. Lit.: **Hafellner (2007)**, **Zhurbenko (2009b)** ..... *M. atricola* (Linds.) Sacc. & D. Sacc.

16. Perithecia 70–150 µm in diam., ascospores 4–8 × 2–3.5 µm, on lichens from different orders, type on *Gyalolechia flavovirescens*. Lit.: Brackel (2014), Roux (2020), **Triebel (1989), present paper** ..... *M. lichenicola* (Sommerf.) D. Hawksw.

Opuscula Philolichenum, **24**: 8–114. 2025.
**pdf effectively published online 8March2025 via (http://sweetgum.nybg.org/philolichenum/)*

Lichenicolous fungi of the Russian Meta-arctic: Detectability, regional activity, and an annotated catalogue

MIKHAIL P. ZHURBENKO [1]

ABSTRACT. – This contribution summarizes all the published data from the literature for lichenicolous fungi of the Russian Meta-arctic, the region encompassing the Arctic and adjacent, floristically similar subarctic highlands to the south, based on 2,656 occurrences of these fungi made by no fewer than 84 collectors at 238 locations. It covers 298 species from 97 genera, including one genus, 33 species and two varieties described from this area. The most species-rich genera of lichenicolous fungi in the region are *Stigmidium* (25 spp.), *Sclerococcum* (18 spp.), *Sphaerellothecium* (17 spp.), *Arthonia* (16 spp.) and *Cercidospora* (15 spp.). An assessment of lichenicolous fungi species based on their detectability (i.e., an assessment of the species' visibility at various levels of magnification) and regional activity/potential (i.e., a measure of frequency, distribution, and host specificity in the given region) is proposed. The majority of species treated received relatively low detectability scores: 52% are readily visible only under at least 10× magnification (under a standard magnifying hand lens) and 34% are readily visible only under at least 20× magnification (under a stereomicroscope). Comparatively few species are readily visible (4%) or sometimes visible (10%) to the naked eye. The most frequent species in the study area are *Sclerococcum deminutum* (140 occurrences), *Catillaria stereocaulorum* (117 occurrences), *Cercidospora punctillata* s. lat. (78 occurrences), *Lasiosphaeriopsis stereocaulicola* (75 occurrences), and *Cercidospora stereocaulorum* (74 occurrences). Approximately one third (34%) of the species are known from a single occurrence in the area. Only 11 species were found to occur in all seven administrative regions of the Russian Meta-arctic: *Catillaria stereocaulorum*, *Cercidospora stereocaulorum*, *Corticifraga peltigerae*, *Lichenochora rinodinae*, *Lichenoconium lecanorae*, *Lichenostigma alpinum*, *Merismatium nigritellum*, *Muellerella erratica*, *Pseudopyrenidium tartaricola*, *Sclerococcum deminutum*, and *Sphaerellothecium minutum*. The majority of species (81%) are known from a single host genus while in contrast a small number of species are known from a broad spectrum of host genera: *Merismatium nigritellum* (20 host genera), *Sclerococcum deminutum* (20 host genera), *Lichenoconium lecanorae* (18 host genera), *Lichenostigma alpinum* (16 host genera), and *Cercidospora punctillata* s. lat. (14 host genera). The regional activity of lichenicolous fungi as an integral indicator of their success in a region is calculated based on assessment of frequency of occurrence, geographical distribution, and host spectrum. The species with the highest regional activity are *Sclerococcum deminutum*, *Lichenoconium lecanorae*, *Merismatium nigritellum*, *Lichenostigma alpinum*, *Cercidospora punctillata* s. lat., and *Muellerella erratica*. Nearly half (49%) of the species appear to be at least moderately pathogenic to their hosts, including 12% are strongly pathogenic. Only a small percentage (9%) of fungi induce galls on the host lichen and a similar percentage (11%) establish on old/dead parts of the host lichens, suggesting they may be primarily or partly saprobes. The most studied part of the Russian Meta-arctic is the north of the Krasnoyarsk Territory, where 67% of all reported species have been recorded. The degree to which the species composition of lichenicolous fungi of the Russian Meta-arctic has been documented was calculated with the Turing coefficient based on the fraction of singletons in the sample and is 66%, thus the true species richness of lichenicolous fungi in the region is estimated to be 450 species. The ratio of lichenicolous fungi/lichens species in the Russian Meta-arctic is about 0.3, which is much higher than this ratio in the world scale (about 0.1). The species *Phacopsis oroarcticae* was restudied for this work and is here reduced into synonymy with *Brodoa oroarctica*.

KEYWORDS. – Biodiversity, lichenicolous mycobiota, Meta-arctic.

[1]MIKHAIL P. ZHURBENKO – Laboratory of Systematics and Geography of Fungi, Komarov Botanical Institute, Russian Academy of Sciences, Professor Popov Street 2B, St Petersburg, 197022, Russia. – email: zhurb58@gmail.com – ORCID: 0000-0002-9839-4698.

INTRODUCTION

Lichenicolous fungi are a highly specialized group of fungi that obligately inhabit lichens. According to the most recent checklist (Diederich et al. 2018), about 2,000 species, subspecies or varieties of lichenicolous fungi are known worldwide.

The Arctic is a physiographic region of the Northern Hemisphere located around the North Pole and occupying about 4% of the Earth's surface. It is characterized by a relatively species-poor (only about 1% of known eukaryotic species occur) but highly specialized biota that includes many taxa adapted to extremely harsh and cold climate conditions (Chernov 2008, Olson et al. 2001). The southern boundary of the Arctic proper is understood here in accordance with CAVM Team (2003) along the northern boundary of the boreal forest. The Russian portion of the Arctic (roughly from 31°E to 169°W) accounts for a significant percentage of its vegetated landmass. The flora of the Arctic proper is very similar in composition and structure to that of the upper treeless vegetation belts of the adjacent subarctic highlands (Yurtsev 1977). As such both can be considered part of a unified flora of a so called 'Meta-arctic', the circumpolar area of distribution of cryophytic floras of the northern hemisphere characterized by a high level of floristic exchange (Yurtsev 1977). The study area is delimited here in this broad sense to include, in addition to Arctic proper, forest tundra and mountain tundra of the adjacent subarctic mountains, such as the Polar Urals, the Putorana Plateau, and the Anyui Plateau.

The first information on lichenicolous fungi of the Russian Meta-arctic appeared in publication by William Nylander well over a century ago where he reported *Sclerococcum urceolatum* from the Barents Sea coast of the Kola Peninsula (Nylander 1866). Over the next 130 years, 23 additional species of lichenicolous fungi were reported from the area (*Arthonia epiphyscia*, *Carbonea vitellinaria*, *Catillaria stereocaulorum*, *Cecidonia umbonella*, *Dacampia engeliana*, *Endococcus propinquus*, *Epilichen stellatus*, *Illosporium carneum*, *Lichenodiplis lecanorae*, *L. lichenicola*, *Merismatium coccisporum*, *M. nigritellum*, *Muellerella pygmaea* s. lat., *Phaeospora rimosicola*, *Rhymbocarpus neglectus*, *R. stereocaulorum*, *Sclerococcum amygdalariae*, *S. deminutum*, *S. purpurascens*, *Sphaerellothecium cladoniicola*, *Stigmidium conspurcans*, *S. haesitans*, and *Tetramelas pulverulentus*; Andreev 1994, Hawksworth & Dyko 1979, Hansen & Alstrup 1995, Keissler 1928, Kihlman 1891, Kümmerling et al. 1993, Lind 1924, Lynge 1928, Räsänen 1943, Triebel 1989, Vainio 1909). These reports were mainly based on collections made by Bernt Lynge from Novaya Zemlya (1921), Mårten Magnus Wilhelm Brenner from the lower Yenisei River in Central Siberia (1876), and Ernst Almquist (1878–79) and Mikhail Andreev (1977, 1982) from Chukotka. Systematic studies of lichenicolous fungi of the Russian Meta-arctic were initiated by the present author under the supervision of Rolf Santesson in 1995 (Zhurbenko & Santesson 1996). An annotated checklist of fungi of the Russian Arctic, published four years later, already contained information on 120 lichenicolous species (Karatygin et al. 1999). The author's unpublished doctoral thesis (Zhurbenko 2010b) entitled "Lichenicolous fungi of the Russian Arctic", included a list of 250 species of these fungi. This last work served as the basis of the present study. Approximately thirty years after the beginning of focused study of lichenicolous fungi of this region, the present work summarizes the current state of knowledge of these remarkable organisms across a large geographic area of the Nothern Hemisphere.

MATERIALS AND METHODS

Occurrence Sources and Herbarium Study. – This catalogue summarizes all literature reports on lichenicolous fungi of the Russian Meta-arctic and contains information on 2656 occurrences of these fungi made by no less than 84 collectors (for three samples the collector's name has not been established) from 238 locations (Figure 1).

The marjority of specimens (2,602, 98% of the total) were intentionally collected by the author (1511) or identified by him as admixtures in the lichen collections of floristicians and geobotanists (1091). Some bias in the collections exists because only lichenologists (A. A. Dobrysh, A. V. Dombrovskaia, I. I. Makarova, V. P. Savicz, and M. P. Zhurbenko) attempted to prepare vouchers documenting the entire lichen flora, while geobotanists collected mainly terricolous lichens, and did not always collect vouchers of the common species already known to them. The primary collectors on whose lichen collections lichenicolous fungi have been found by the author are I. I. Makarova (335 specimens mainly from Chukotka), V. P. Savicz (130 specimens from Franz Josef Land, Vize Island and Severnaya Zemlya), S. S. Kholod (102 specimens mainly from Wrangel Island), N. V. Matveeva (85 specimens from the Putorana Plateau, Taymyr Peninsula and Severnaya Zemlya), A. E. Katenin (52 specimens from Chukotka), O. V.

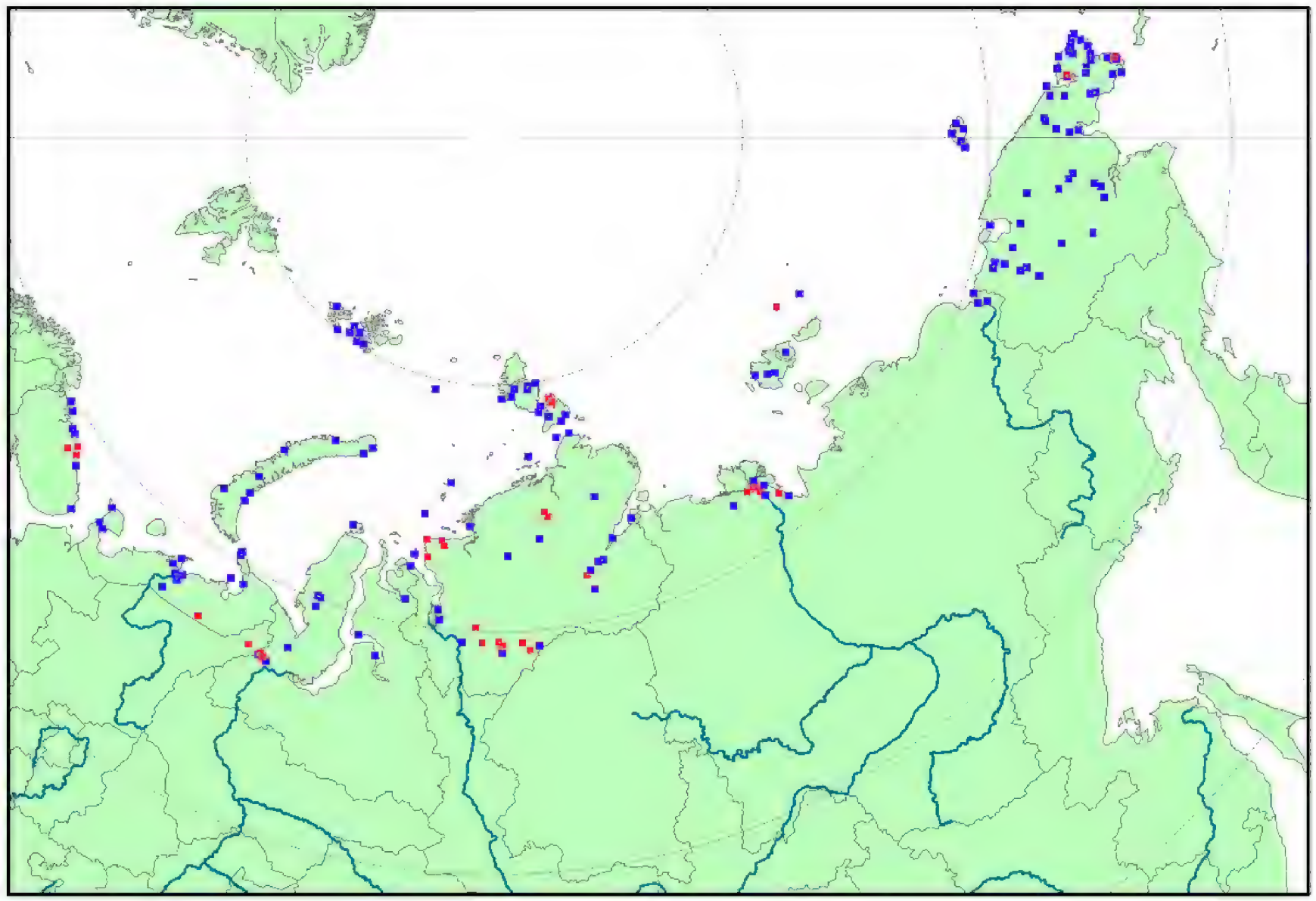

Figure 1. Main collection locations of lichenicolus fungi in the Russian Meta-arctic, with those of the author (M.P. Zhurbenko) denoted by red squares and those of other collectors denoted by blue squares.

Lavrinenko (43 specimens from the Nenets Autonomous Area), and V. B. Kuvaev (42 specimens from the Taymyr Peninsula) (Figure 2).

In preparing the catalogue, label information was added or corrected or the 'parasite' species was reidentified (see Erroneous and Doubtful Records) for some specimens. The specimens on which these data are based are mostly kept in LE (2448 specimens, 92% of the total), but other herbaria were also consulted as follows: C (2 specimens), GZU (21 specimens), H (1 specimen), H-Nyl (1 specimen), HAL (4 specimens), M (17 specimens), O (7 specimens), S (7 specimens), TU (1 specimen), and UPS (43 specimens). The remaining 104 occurrences are based on specimens for which no precise information on voucher has been found or a supporting voucher is not deposited in a herbarium.

Metric of Species Detectability. – For this study, the detectability of each species was evaluated subjectively based on review of available herbarium specimens. Each species was categorized as belonging to one of four classes of detectability: 1) readily visible to the naked eye; 2) sometimes visible to the naked eye; 3) readily visible only under at least 10× magnification (under a standard magnifying hand lens); or 4) readily visible only under 20× or greater magnification (under a stereomicroscope).

Metric of Regional Activity. – The concept of regional activity of seed plant species in vegetation cover as a way of expressing the measure of their success in the given region was introduced by Yurtsev (1968, 1987, 2004). This study attempts to apply the concept to species of lichenicolous fungi following the approach of Yurtsev (2004) but modified for these taxa. The regional activity of a lichenicolous fungus species in the Russian Meta-arctic was assessed based on the following parameters: 1) frequency of occurrence, 2) geographical distribution by administrative regions, and 3) number of host lichen genera infected (host flexibility). The range of occurrence values (from 1 to 140 occurrences) was binned into one of five classes on a logarithmic scale (logarithm with base 3) as follows: 1–3 (very rare), 4–9 (rare), 10–27 (infrequent), 28–81 (frequent), 82–140 (very frequent). The breadth of geographical distribution (occurrence in 1 to 7 regions) was binned into four classes on an arithmetic scale as follows: 1–2, 3–4, 5–6, 7. The number of infected hosts (scored as from 1 to 20 genera) was binned into five classes on a logarithmic scale (logarithm with base 2): 1–2, 3–4, 5–8, 9–16, 17–20. Thus, each species was assigned to one of five classes of occurrence, one of four classes of geographic distribution, and one of five classes of

Figure 2. Main collectors of lichenicolous fungi in the Russian Meta-arctic. **A,** Vsevolod P. Savicz (top centre), on the voyage on the icebreaker Sedov, 1930. **B,** Irina I. Makarova, in Chukotka, 1975(?). **C,** Mikhail P. Zhurbenko, on the Taymyr Peninsula, 1994. **D,** Sergei S. Kholod, on Kolguev Island, 2023. **E,** Olga V. Lavrinenko, on Kolguev Island, 2012. **F,** Nadezhda V. Matveeva, on the Taymyr Peninsula, 2010.

Table 1. The regional activity scores of species of lichenicolous fungi in the Russian Meta-arctic. Species activity was determined by the sum of the scores as follows: low-activity species (3–5 scores; in yellow), medium-activity species (6–9 scores; in green), and high-activity species (10–14 scores; in red).

Classes of host flexibility	Classes of geographic distribution	Classes of occurrence				
		1 (very rare) 1–3 occurrences	2 (rare) 4–9 occurrences	3 (infrequent) 10–27 occurrences	4 (frequent) 28–81 occurrences	5 (very frequent) 82–140 occurrences
1 (1–2 host genera)	1 (1–2 regions)	**3**	**4**	**5**	**6**	**7**
	2 (3–4 regions)	**4**	**5**	**6**	**7**	**8**
	3 (5–6 regions)	**5**	**6**	**7**	**8**	**9**
	4 (7 regions)	**6**	**7**	**8**	**9**	**10**
2 (3–4 host genera)	1 (1–2 regions)	**4**	**5**	**6**	**7**	**8**
	2 (3–4 regions)	**5**	**6**	**7**	**8**	**9**
	3 (5–6 regions)	**6**	**7**	**8**	**9**	**10**
	4 (7 regions)	**7**	**8**	**9**	**10**	**11**
3 (5–8 host genera)	1 (1–2 regions)	**5**	**6**	**7**	**8**	**9**
	2 (3–4 regions)	**6**	**7**	**8**	**9**	**10**
	3 (5–6 regions)	**7**	**8**	**9**	**10**	**11**
	4 (7 regions)	**8**	**9**	**10**	**11**	**12**
4 (9–16 host genera)	1 (1–2 regions)	**6**	**7**	**8**	**9**	**10**
	2 (3–4 regions)	**7**	**8**	**9**	**10**	**11**
	3 (5–6 regions)	**8**	**9**	**10**	**11**	**12**
	4 (7 regions)	**9**	**10**	**11**	**12**	**13**
5 (17–20 host genera)	1 (1–2 regions)	**7**	**8**	**9**	**10**	**11**
	2 (3–4 regions)	**8**	**9**	**10**	**11**	**12**
	3 (5–6 regions)	**9**	**10**	**11**	**12**	**13**
	4 (7 regions)	**10**	**11**	**12**	**13**	**14**

host flexibility (specialization/generalization). Maximum scores were assigned to classes corresponding to the most frequent, widespread or 'omnivorous' species. The activity of a species was determined by the sum of the scores calculated on these three parameters and assigned to one of the three categories: 3–5 (low-active), 6–9 (medium-active), and 10–14 (highly-active) (Table 1). The regional activity scores for each species are expressed in a way that is relative to the other scored taxa, but it is important to recognize that score is not intended to necessarily suggest that any of the highly-active species play a significant role in the overall trophic structure of meta-arctic ecosystems.

Estimate of Regional Lichenicolous Fungus Diversity. – To assess the completenss of identification of the lichenicolous mycobiota reported here, the Turing coefficient (*C*) was used, weighted by the proportion of singletons (i.e., species represented by a single occurrence) in the mycobiota, expressed as a percentage. This was calculated following Leontyev (2008) using the formula $C = (1 - (f/S)) * 100\%$, where f = the number of singletons and S = the total number of species found.

RESULTS AND DISCUSSION

This catalogue presents records of 298 species of lichenicolous fungi from 97 genera. Of these, one genus (*Baliomyces*), 33 species (*Abrothallus psoromatis*, *Acaroconium lavrinenkoae*, *Arthonia triebeliae*, *Baliomyces taimyricus*, *Cercidospora epithamnolia*, *C. ochrolechiae*, *C. thamnoliae*, *Cladophialophora novozhilovii*, *Clypeococcum bisporum*, *C. lenae*, *Corticifraga fusispora*, *Didymellopsis solorinae*, *Endococcus hafellneri*, *Epilichen stellatus*, *Lasiosphaeriopsis pilophori*, *Lichenochora rinodinae*, *L. sedelnikoviorum*, *Lichenodiplis lichenicola*, *Lichenopeltella stereocaulorum*, *Lichenosticta dombrovskae*, *Neolamya ahtii*, *Rhymbocarpus makarovae*, *Sagediopsis pertusariicola*, *Sphaerellothecium siphulae*, *S. soechtingii*, *S. taimyricum*, *Sphaeropezia japewiae*, *S. santessonii*, *S. thamnoliae*, *Stigmidium haesitans*, *S. stereocaulorum*, *Taeniolella arctoparmeliae*, and *T. rolfii*) and two varieties (*Opegrapha pulvinata* var. *placidiicola* and *Talpapellis peltigerae* var. *rossica*) have been described based on material collected in the Russian Meta-arctic. Seven species have been distributed in various exsiccatae.

The most species-rich genera of lichenicolous fungi in the region are *Stigmidium* (25 species), *Sclerococcum* (18 species), *Sphaerellothecium* (17 species), *Arthonia* (16 species), *Cercidospora* (15 species), *Lichenochora* (10 species), *Endococcus* (8 species), *Abrothallus* (7 species), *Merismatium* (6 species), *Muellerella* (6 species), *Taeniolella* (6 species), and *Zwackhiomyces* (6 species).

With few exceptions, such as *Arthonia intexta*, almost all species of lichenicolous fungi can be detected with the naked eye or under a stereomicroscope (see e.g. Diederich et al. 2018). The visibility, and by extension detectability, of a given species depends on several factors. These include: 1) the size of the exposed part of their fruiting bodies; 2) the presence of contrasting coloration between the parasite and the host thallus; and 3) the ability to cause discolorations, necrotic patches or other malformations that are likely to be noticed by the observer as atypical of the morphology of the host lichen. An analysis of the detectability of the species examined showed that only 4% (*Abrothallus caerulescens*, *A. parmeliarum*, *A. suecicus*, *Arthonia fuscopurpurea*, *Arthophacopsis parmeliarum*, *Corticifraga peltigerae*, *Homostegia piggotii*, *Nesolechia cetrariicola*, *N. oxyspora*, *Plectocarpon linitae*, *Thamnogalla crombiei*, and *Zyzygomyces bachmannii*) are readily visible to the naked eye (Figure 3). Another 10% are sometimes visible to the naked eye, 52% are readily visible only under at least 10× magnification, and the remaining 34% are readily visible only under 20× or greater magnification (Figure 4). Such low visual detectability of lichenicolous fungi without magnification has already been shown to make post-collection inspection of herbarium collections of host lichens with a stereomicroscope far more effective and efficient than attempts at detection of all species in the field (Zhurbenko 2023c). In fact, at least half of the specimens in this catalogue were discovered in this way. It is important to note, nonetheless, that 66% of the analysed species can be found directly in the field if one uses a 10× hand lens and is familiar with their gross morphology and the manifestation of infection on the host.

The most frequent species examined were *Sclerococcum deminutum* (140 vouchers), *Catillaria stereocaulorum* (117 vouchers), *Cercidospora punctillata* s. lat. (78 vouchers), *Lasiosphaeriopsis stereocaulicola* (75 vouchers), *Cercidospora stereocaulorum* (74 vouchers), *Stigmidium peltideae* (49 vouchers), *Arthonia stereocaulina* (48 vouchers), *Sphaerellothecium cladoniae* (48 vouchers), *Lichenostigma alpinum* (46 vouchers), and *Sphaerellothecium minutum* (46 vouchers). One hundred and two species (34% of the total) are represented by a single voucher.

Breadth of geographic distribution in the region was quantified by the number of administrative regions each species was recorded from. Only 11 species were found to occur in all seven administrative

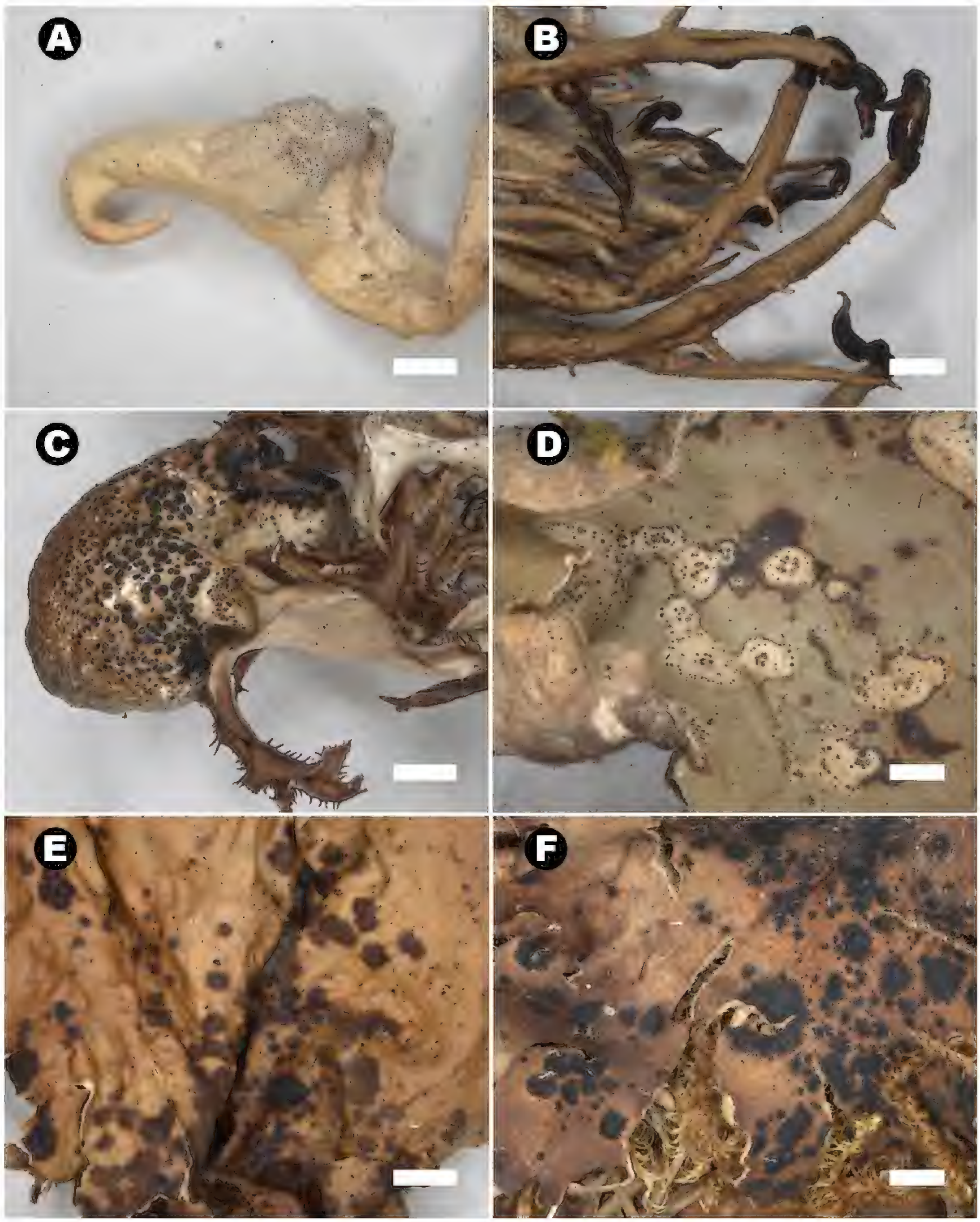

Figure 3. Some species of lichenicolous fungi from the Meta-arctic readily visible to the naked eye. **A,** *Thamnogalla crombiei* (LE 233697). **B,** *Zyzygomyces bachmannii* (LE 262177). **C,** *Nesolechia cetrariicola* (LE 309640). **D,** *Corticifraga peltigerae* (LE 233697). **E,** *Plectocarpon linitae* (LE 233304). **F,** *Arthonia fuscopurpurea* (LE F-233914). Scale bars = 2 mm.

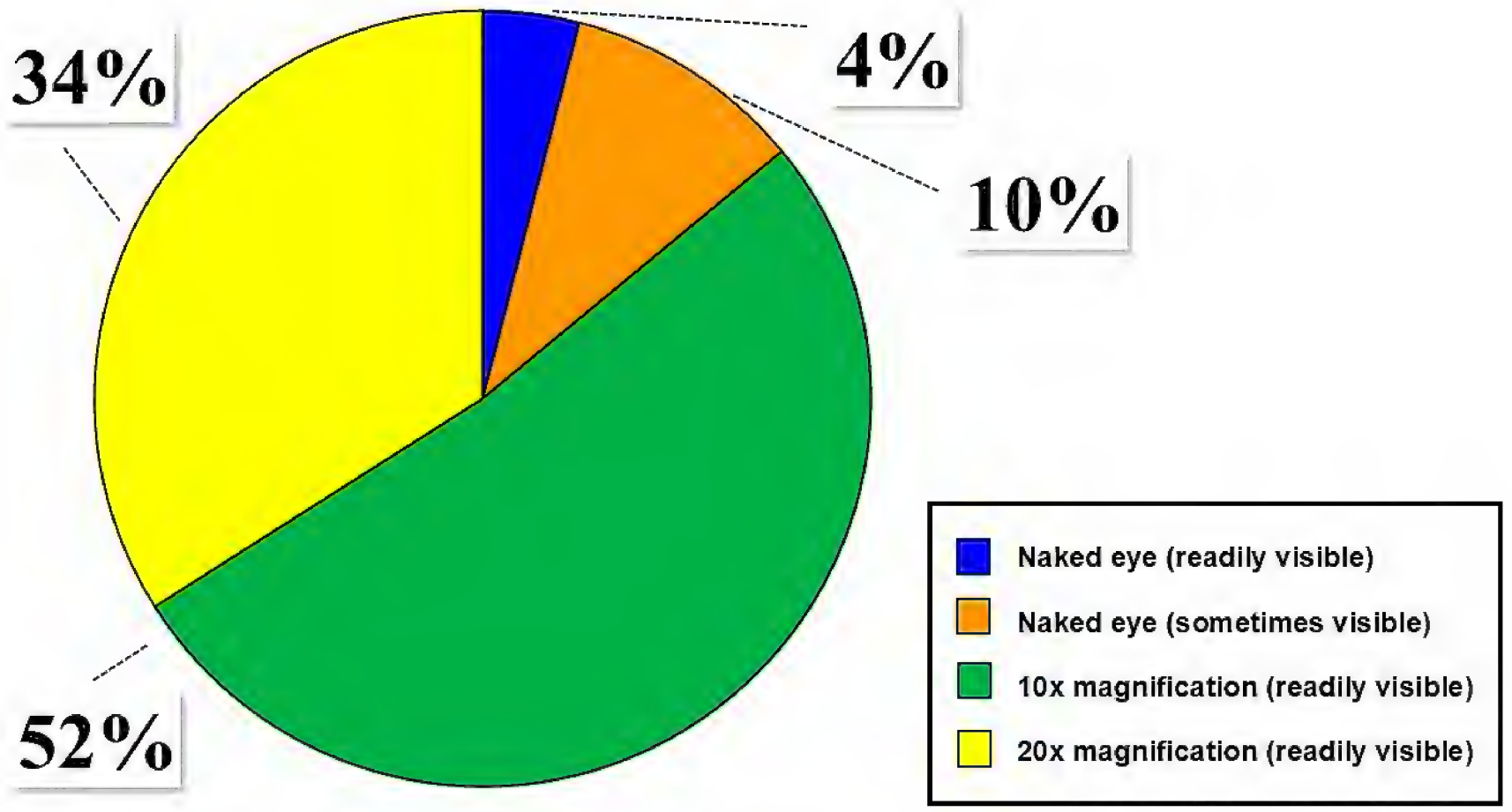

Figure 4. Percentages of lichenicolous fungi of the Russian Meta-arctic with each degree of detectability.

regions: *Catillaria stereocaulorum*, *Cercidospora stereocaulorum*, *Corticifraga peltigerae*, *Lichenochora rinodinae*, *Lichenoconium lecanorae*, *Lichenostigma alpinum*, *Merismatium nigritellum*, *Muellerella erratica*, *Pseudopyrenidium tartaricola*, *Sclerococcum deminutum*, and *Sphaerellothecium minutum*. Of these widely distributed taxa, four are among the generalists with a broadly documented range of hosts (*Lichenoconium lecanorae*, *Lichenostigma alpinum*, *Merismatium nigritellum*, and *Muellerella erratica*). Similary, three of them are among the most frequently collected species (*Catillaria stereocaulorum*, *Cercidospora stereocaulorum*, and *Sphaerellothecium minutum*).

The host flexibility of lichenicolous fungi in the Russian Meta-arctic was quantified by the number of host lichen genera parasitized (Figure 5). The majority of taxa (242 species, 81% of the total) were recorded on a single host genus, suggesting a strong degree of host specificity. In contrast, very few taxa are found to be generalists occurring on a range of host genera. These generalist parasites included *Merismatium nigritellum* (20 host genera), *Sclerococcum deminutum* (20), *Lichenoconium lecanorae* (18), *Lichenostigma alpinum* (16), *Cercidospora punctillata* s. lat. (14), *Muellerella lichenicola* (10), *Merismatium heterophractum* (9), *Muellerella erratica* (8), *Intralichen lichenicola* s. lat. (6), *Endococcus rugulosus* s. lat. (5), *Lichenoconium usneae* (5), *Merismatium coccisporum* (5), *M. decolorans* (5), and *Sclerococcum parasiticum* (5).

Using regional activity score as a metric to approximate the success of individual taxa in terms of their relative frequency, range size and host flexibility, species with the highest scores are *Sclerococcum deminutum* (14), *Lichenoconium lecanorae* (13), *Merismatium nigritellum* (13), *Lichenostigma alpinum* (12), *Cercidospora punctillata* s. lat. (11), *Muellerella erratica* (11), *Catillaria stereocaulorum* (10), *Muellerella lichenicola* (10), *Carbonea vitellinaria* (9), *Cercidospora stereocaulorum* (9), *Corticifraga peltigerae* (9), *Merismatium heterophractum* (9), and *Sphaerellothecium minutum* (9).

One hundred and forty-six species (49% of the total) exhibit some degree of apparent pathogenicity, including 35 species (12%) that cause strong pathogenic effects on the host lichen. Twenty-six species (9%) induce the formation of galls in host lichens. The establishment on old or dead parts of lichens, rather then on the young ones, is favoured by 34 species (11%), suggesting that these taxa are more or less saprobic.

The number of lichenicolous fungi known from different regions of the Russian Meta-arctic is given in Appendix 1. The most thoroughly studied regions are the north of the Krasnoyarsk Territory and Chukotka Autonomous Area, from which 200 and 162 species of these fungi are known, respectively.

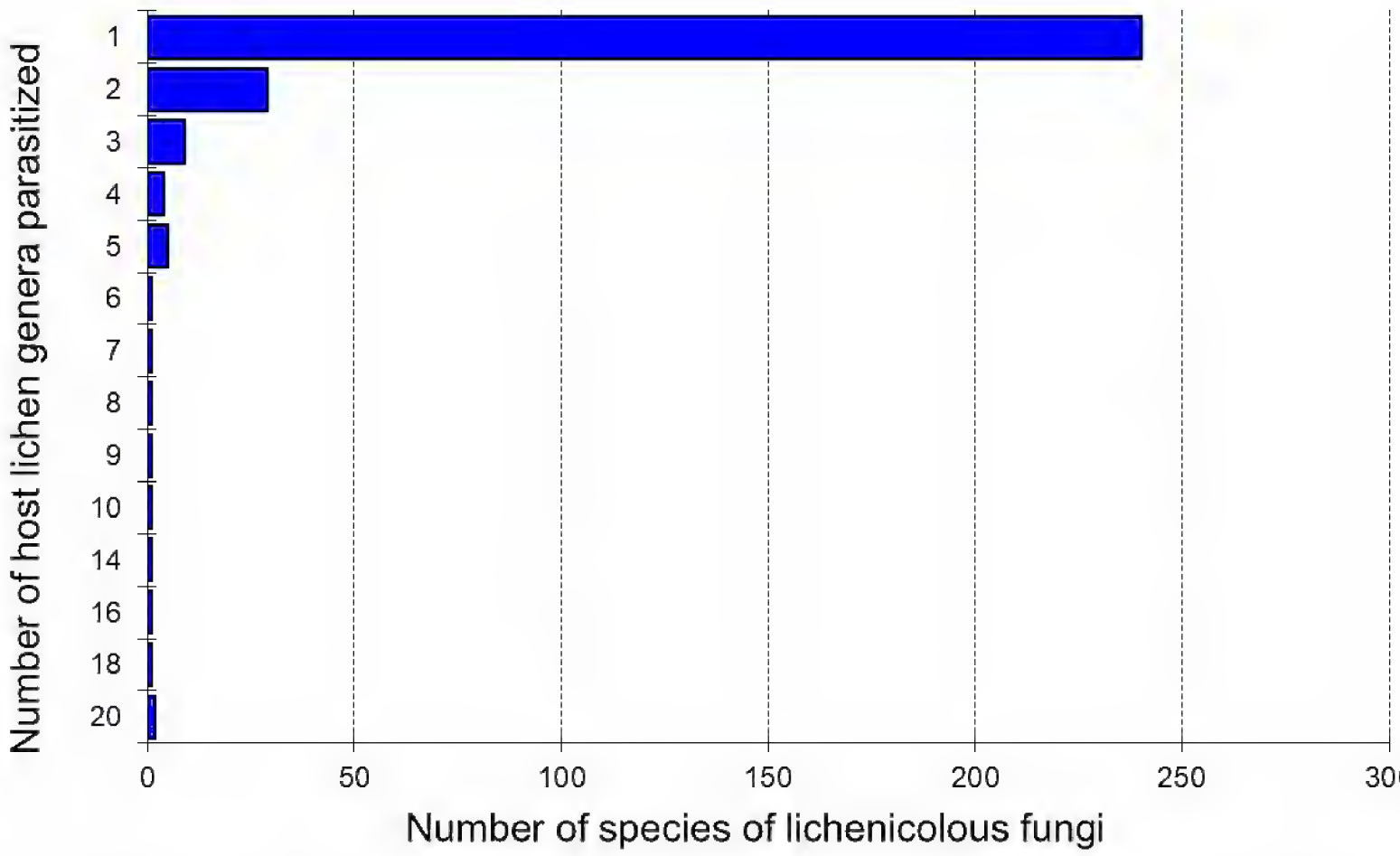

Figure 5. Host flexibility of lichenicolous fungi of the Russian Meta-arctic as measured by the number of host genera parasitized by each lichenicolous fungus species.

The completeness of identification of the lichenicolous mycobiota of the Russian Meta-arctic was estimated to be 66% according to the Turing coefficient based on the fraction of singletons (102/298). Thus the true species richness of lichenicolous fungi in the region is estimated to be about 450 species. Following Leontyev (2008) 66% is a sufficient level of completeness for a regional microfungal biota to be analysed. The fact that a number of low-detectabiltiy species, which are difficult to collect purposefully in the field, such as *Bryostigma excentricum*, *Cercidospora stereocaulorum*, and *Merismatium nigritellum* were among the frequent taxa in our sample also suggests that the biota has been sufficiently sampled. This is also supported by the large number of specimens studied (2656) which is comparable to the total number of known species of lichenicolous fungi in the world (c. 2,000; Diederich et al. 2018). If we assume that 1) the number of lichen species in the Russian Meta-arctic is approximately the same as in the Russian Arctic (c. 1,078; Andreev et al. 1996) and 2) the level of completenss of identification of its lichen flora and lichenicolous mycobiota is similar, then the Lichenicolous Index (the ratio of lichenicolous fungi/lichens species in a given area; Zhurbenko 2011) for this area will be ca 0.3. This ratio seems high, relative to the ratio worldwide (c. 0.1), given that there are ca 19,000 known lichen species in the world (Lücking et al. 2017).

ANNOTATED SPECIES CATALOGUE

This contribution is intended to summarize all of the available information relating to the lichenicolous fungi of the Russian Meta-arctic. The catalogue is arranged alphabetically by genus then species. Each species is characterized in terms of its detectability, frequency of occurrence, regional activity, spectrum of host lichens, and biology. Data on frequency of occurrence, host lichen spectrum and infected parts of the host lichens are based only on the occurences cited herein. Information on species biology (sensu Hawksworth 1982, 2003, Lawrey & Diederich 2003) is based on cited literature and/or, in some cases, on examination of the available herbarium specimens.

For each species the occurences are cited by administrative regions of Russia situated wholly or partly within the Meta-arctic, ordered from west to east and from north to south. Within the regions, toponyms of collection locations are given alphabetically by keyword. For more information on the collection locations, see Appendix 1. Where known, each occurrence is supported by the date of collection, the collector and the herbarium that holds the supporting specimen. The names of collectors are given without initials, except for those with the same surname. The ALA-LC Romanization tables for Russian

(2023) were used to transliterate Russian toponyms and names of people, unless they had an accepted English spelling.

***Abrothallus bertianus* De Not.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Montanelia panniformis* (thallus). Commensal.

VOUCHER. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93127* (LE 232176).

REPORT. – Zhurbenko (2008).

***Abrothallus caerulescens* I. Kotte**

CHARACTERIZATION. – Quite visible to the naked eye. Very rare (1). Low-active. On *Xanthoparmelia stenophylla* (thallus). Commensal.

VOUCHER. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93126a* (LE 232153).

REPORT. – Zhurbenko (2008).

***Abrothallus cladoniae* R. Sant. & D. Hawksw. s. lat.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Cladonia gracilis* ssp. *vulnerata* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Vesnovannaia River, 8.vi.1950, *Avramchik s.n.* (LE 308478).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Abrothallus lobariae* (Diederich & Etayo) Diederich & Ertz**

(≡ *Phoma lobariae* Diederich & Etayo)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Lobaria linita* (thallus). Weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Baran'e Lake, 31.vii.1980, *Makarova s.n.* (LE 260668).

REPORT. – Zhurbenko & Braun (2013).

***Abrothallus parmeliarum* (Sommerf.) Arnold**

(= *Abrothallus cetrariae* I. Kotte)

CHARACTERIZATION. – Quite visible to the naked eye. Infrequent (20). Medium-active. Mostly on thalli of *Parmelia fraudans*, *P. omphalodes* (including *P. omphalodes* ssp. *glacialis*), and *P. sulcata*; occasionally on thalli of *Asahinea scholanderi* and *Melanohalea septentrionalis*. Commensal.

VOUCHERS. – **MURMANSK REGION.** 15 km N of Tumannyĭ settlement, 19.viii.1997, *Zhurbenko 97343a* (LE 233260a). – **YAMAL-NENETS AUTONOMOUS AREA.** Neromaiakha River, 16.vii.1990, *Khitun s.n.* (LE 233380). Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9323* (LE 308536), *Zhurbenko 9338* (LE 308537), *Zhurbenko 9339* (LE 308540); 27.vi.1993, *Zhurbenko 93119a* (LE 232158a). – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko 90368b* (LE 207697b), *Zhurbenko 90788* (LE 260293). – PUTORANA PLATEAU. Kapchuk Lake, 8.viii.1983, *Zhurbenko 83174* (LE 206906). – TAYMYR PENINSULA. Bikada River, vii.1989, *Pospelova s.n.* (LE 233159). Bol'shaia Bootankaga River, 8.vii.1991, *Kuvaev s.n.* (LE 233021, LE 260252); 10.vii.1991, *Kuvaev s.n.* (LE 260242). South of Levinson-Lessinga Lake, 29.vii.1995, *Zhurbenko 95339* (LE 232972); 31.vii.1995, *Zhurbenko 95351* (LE 233309). Ragozinka River, 12.vii.1990, *Zhurbenko 90805* (LE 260113); 14.vii.1990, *Zhurbenko 90796* (LE 260263). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98292* (LE 233239). Tiksi settlement, 18.vii.1998, *Zhurbenko 98293* (LE 233229). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 9.vii.1979, *Makarova s.n.* (LE 233179). Lavrentiia settlement, 29.vii.1973, *Makarova s.n.* (LE 233269a).

REPORTS. – Zhurbenko (2002b, 2008, 2009a, 2009b), Zhurbenko & Hafellner (1999).

***Abrothallus psoromatis* (Zhurb. & U. Braun) Diederich & Zhurb.**

(≡ *Phoma psoromatis* Zhurb. & U. Braun)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Low-active. On *Psoroma hypnorum* (apothecium discs). Weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** IAmboto Lake, 18.viii.1998, *Kustysheva s.n.* (LE 261602). – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. Ragozinka River, 5.vii.1990, *Zhurbenko 90713* (LE 261612); 13.vii.1990, *Zhurbenko 90717* (LE 261532, holotype). – **CHUKOTKA AUTONOMOUS AREA.** Koliuchinskaia Bay, 4.viii.1980, *Katenin s.n.* (HAL 2533 F). – WRANGEL ISLAND. Gusinaia River, 23.vii.1991, *Kholod s.n.* (LE 260879).

REPORT. – Zhurbenko & Braun (2013).

***Abrothallus suecicus* (Kirschst.) Nordin**

CHARACTERIZATION. – Quite visible to the naked eye. Very rare (1). Low-active. On *Ramalina pollinaria* (thallus). Weak pathogen.

VOUCHER. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93124* (LE 232143).

REPORT. – Zhurbenko (2008).

***Acanthonitschkea peltigericola* (Alstrup & Olech) O.E. Erikss. & R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Peltigera scabrosa* (thallus). Commensal.

VOUCHER. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 27.vii.1930, *Savicz 529* (LE 206905, UPS).

REPORT. – Zhurbenko & Santesson (1996).

***Acaroconium lavrinenkoae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Solorina saccata* (apothecium discs). Commensal.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Seduiakha River, 3.viii.1998, *O. V. Lavrinenko s.n.* (LE 310192, holotype).

REPORT. – Zhurbenko (2021c).

***Adelococcus alpestris* (Zopf) Theiss. & Syd.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Acarospora putoranica* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 6.viii.1995, *Zhurbenko 95515* (LE 260024).

REPORT. – Zhurbenko (2009b).

***Adelococcus immersus* Etayo & Breuss**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Dermatocarpon miniatum* var. *complicatum* (thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 24.vii.1995, *Zhurbenko 95605* (LE 310199). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95604* (LE 310200).

REPORT. – Zhurbenko (2021a).

***Arthonia almquistii* Vain.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Amygdalaria panaeola* (thallus). Commensal or weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Puoten settlement, 23.vii.1972, *Makarova s.n.* (LE 232861).

REPORT. – Zhurbenko (2009a).

***Arthonia apotheciorum* (A. Massal.) Almq.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Myriolecis albescens* (apothecia). Commensal.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Dolgiĭ Island, 24.vii.2005, *O. V. Lavrinenko s.n.* (herbarium unknown). Matveev Island, 27.vii.2005, *O. V. Lavrinenko s.n.* (herbarium unknown).

REPORT. – Urbanavichus (2010).

***Arthonia clemens* (Tul.) Th. Fr.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Rare (4). Low-active. On apothecia of saxicolous *Lecanora* sp. and *Rhizoplaca chrysoleuca*. Weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 23.vii.1930, *Savicz 64* (LE 206908); 2.viii.1930, *Savicz 17bis* (LE 206910). – **CHUKOTKA AUTONOMOUS AREA.** Mil'kera River, 1977, *M. P. Andreev s.n.* (GZU). – WRANGEL ISLAND. Sovetskaia River, 26.viii.1991, *Kholod s.n.* (LE 210426).

REPORTS. – Fleischhacker et al. (2016), Zhurbenko (2008), Zhurbenko & Santesson (1996).

***Arthonia digitatae* Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (18). Medium-active. On thalli (podetia, occasionally basal squamules) of *Cladonia arbuscula*, *C. cariosa*, *C. coccifera*, *C. cyanipes*, *C. furcata*, *C. macroceras*, *C. pyxidata*, *C. stricta*, and *Cladonia* sp. Commensal or weak pathogen.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Saletaiakha River, 9.viii.1990, *Rebristaia s.n.* (LE 308819). – **KRASNOYARSK TERRITORY.** Ptichiĭ Island, 25.vii.1993, *Kuvaev 2126* (LE 308514). Sibiriakova Island, 19.vii.1990, *Kuvaev 1537* (LE 308815). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 16.vii.2000, *Matveeva s.n.* (LE 309281). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 26.viii.1995, *Zhurbenko 95600a* (LE 308920a); 30.viii.1995, *Zhurbenko 95593* (LE 308884). South of Levinson-Lessinga Lake, 28.viii.1995, *Zhurbenko 95594* (LE 308891), *Zhurbenko 95599a* (LE 308916a). Syrutaturku Lake, 21.viii.1994, *Pospelova s.n.* (LE 207410). Tareia settlement, 2.vii.1965, *Matveeva s.n.* (LE 308750). – **REPUBLIC OF SAKHA (YAKUTIA).** Samoĭlovskiĭ Island, 26.vii.1998, *Zhurbenko 98414* (LE 308900). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 5.vii.1979, *Makarova s.n.* (LE 308783a). Ėnmyvaam River, 3.vii.1980, *Makarova s.n.* (LE 308817). Iskaten' Ridge, 3.vii.1971, *Makarova s.n.* (LE 308558). Paliavaam settlement, 16.viii.1989, *Yurtsev s.n.* (LE 308784). Pepenveem River, 3.viii.1970, *Galanin s.n.* (LE 308814). Televeem River, 22.vii.1979, *Makarova s.n.* (LE 308771). – WRANGEL ISLAND. Verkhniaia Mamontovaia River, 16.vii.1996, *Kholod s.n.* (LE 308825).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Arthonia epimela* (Almq.) I.M. Lamb**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Biatora subduplex* (thallus). Commensal.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Dolgiĭ Island, 16.vii.2004, *O. V. Lavrinenko s.n.* (herbarium unknown).

REPORT. – Urbanavichus (2010).

***Arthonia epiphyscia* Nyl.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (9). Medium-active. On thalli, occasionally apothecia, of *Phaeorrhiza sareptana* var. *sphaerocarpa* (uncertain report), *Physcia caesia* and *P. dubia*. Commensal or weak pathogen.

VOUCHERS. – **MURMANSK REGION.** Olenka River mouth, 6.ix.1997, *Zhurbenko 97358* (LE 233331). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 2.viii.1930, *Savicz 9a* (LE 206918). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9358* (LE F-332204); 27.vi.1993, *Zhurbenko 93151* (LE 260281). – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94126b* (LE 206917). – **CHUKOTKA AUTONOMOUS AREA.** Ėnmyvaam River, 30.vi.1980, *Makarova s.n.* (LE 233232; as *A.* cf. *epiphyscia*). Ioni Lake, 7.vii.1977, *Makarova s.n.* (LE 233698a). Pitlekaĭ settlement, 1878–79, *Almquist s.n.* (S). Vesnovannaia River, 14.viii.1980, *Makarova s.n.* (LE 233518).

REPORTS. – Vainio (1909), Zhurbenko (2002b, 2009a, 2009b), Zhurbenko & Santesson (1996).

***Arthonia fuscopurpurea* (Tul.) R. Sant.**

CHARACTERIZATION. – Quite visible to the naked eye. Rare (5). Low-active. On thalli of *Peltigera* '*occidentalis*', *P. polydactylon*, *P. scabrosa*, and *Solorina* sp. Commensal or facultative saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. South of Aian Lake, viii.1984, *Zhurbenko 84215* (LE 206916). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 20.vii.1996, *Zhurbenko 96958* (LE 233914). – TAYMYR PENINSULA. Tareia settlement, 30.vii.1965, *Matveeva s.n.* (LE 233948). – **REPUBLIC OF SAKHA (YAKUTIA).** Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98345* (LE 233725). Samoĭlovskiĭ Island, 15.viii.1998, *Zhurbenko 98329* (LE 233747).

REPORTS. – Zhurbenko (2009b), Zhurbenko & Hafellner (1999).

***Arthonia* cf. *lepidophila* (Anzi) Clauzade, Diederich & Cl. Roux comb. inval.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Cladonia* sp. (thallus). Possibly a weak pathogen or saprobe.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 24.vii.2007, *Zhurbenko 0776* (LE 308585).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Arthonia molendoi* (Frauenf.) R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (11). Medium-active. On apothecia, sometimes thalli, of *Caloplaca saxicola*, *Rusavskia elegans*, and *Xanthomendoza borealis*. Weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 29.vii.2019, *Konoreva 234* (LE F-350216). – **NENETS AUTONOMOUS AREA.** Bol'shoĭ TSinkovyĭ Island, 1997, *Shevchenko s.n.* (LE 261708). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. North of Aian Lake, 5.viii.1984, *Zhurbenko 84144* (LE 206923), *Zhurbenko 84153* (LE 206922). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 6.viii.1995, *Zhurbenko 95523* (LE 261728); 20.viii.1995, *Zhurbenko 95323* (LE 233023), *Zhurbenko 95529a* (LE 261778a); 26.viii.1995, *Zhurbenko* 95535a (LE 261767a). South of Levinson-Lessinga Lake, 31.vii.1995, *Zhurbenko 95531* (LE 261568). – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Gusinaia River, 5.viii.1991, *Shtrik s.n.* (LE 210458b). Sovetskaia River, 26.viii.1991, *Kholod s.n.* (LE 210395).

REPORTS. – Chesnokov & Konoreva (2023), Zhurbenko (2008, 2009a, 2009b), Zhurbenko & Hafellner (1999).

***Arthonia obscurior* Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Pilophorus dovrensis* (apothecium discs). Possibly a weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 26.vii.1977, *Makarova s.n.* (LE 207443b).

REPORT. – Zhurbenko & Triebel (2005).

***Arthonia pannariae* Zhurb. & Grube**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (29). Medium-active. On apothecium discs, rarely thalli of *Protopannaria pezizoides*, *Psoroma hypnorum*, and *P. tenue* var. *boreale*. Pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Northbrook Island, 28.vii.1930, *Savicz 523* (UPS). Scott Kelly Island, 25.vii.1930, *Savicz 1253* (LE 206907). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 10.viii.1997, *Matveeva s.n.* (LE 260128). Cape Baranova, 13.vii.1996, *Zhurbenko 96837* (LE 233100); *Zhurbenko 96841* (LE 232819); 15.vii.1996, *Zhurbenko 96840* (LE 233080), *Zhurbenko 96844* (LE 233020); 20.vii.1996, *Zhurbenko 96842* (LE 232809). Mikoiana Bay, 20.vii.1996, *Zhurbenko 96839* (LE 232830). Mount Ostraia, 11.vii.1996, *Zhurbenko 96838* (LE 232880). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1994, *Zhurbenko 94294* (LE 206909). North of Levinson-Lessinga Lake, 6.viii.1995, *Zhurbenko 95503* (LE 260208); 20.viii.1995, *Zhurbenko 95230* (LE 232980); 26.viii.1995, *Zhurbenko 95502* (LE 260048). North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 8360* (LE 260108). Ragozinka River, 5.vii.1990, *Zhurbenko 90714* (LE 260267); 13.vii.1990, *Zhurbenko 90716* (LE 260247), *Zhurbenko*

90699 (LE 260025); 14.vii.1990, *Zhurbenko 90718* (LE 260207). Uboĭnaia River mouth, 1.viii.1990, *Zhurbenko 90707* (LE 260125). – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko* 98379 (LE 260218). Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98383* (LE 260158); 8.viii.1998, *Zhurbenko 98380* (LE 260278). Samoĭlovskiĭ Island, 27.vii.1998, *Zhurbenko 98420* (LE 233010), *Zhurbenko 98382* (LE 260228); 15.viii.1998, *Zhurbenko 98381* (LE 260258). – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Klark River, 1998, *Kholod s.n.* (LE 260068). Krasnyĭ Flag River, 10.viii.1997, *Kholod s.n.* (LE 232940). Tundrovaia River in its middle reaches, 24.viii.1995, *Kholod s.n.* (LE 260058).

REPORTS. – Zhurbenko & Grube (2010), Zhurbenko & Santesson (1996).

***Arthonia peltigerea* Th. Fr.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very rare (3). Low-active. On *Solorina saccata* (apothecia, thallus). Weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND, Hooker Island, 2.viii.1930, *Savicz 9* (LE 206925, LE 206926, LE 206927, UPS). – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 25.viii.1994, *Zhurbenko 94451* (LE 206924). – **REPUBLIC OF SAKHA (YAKUTIA).** Samoĭlovskiĭ Island, 12.vii.1988, *Makarova s.n.* (LE 233703).

REPORTS. – Zhurbenko (2009b), Zhurbenko & Santesson (1996).

***Arthonia peltigerina* (Almq.) H. Olivier**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (39). Medium-active. On thalli (mostly at the lobe margins), sometimes cephalodia or apothecia of *Peltigera aphthosa*, *P. canina*, *P. continentalis*, *P. elisabethae*, *P. extenuata*, *P. leucophlebia*, *P. malacea*, *P.* '*occidentalis*', *P. polydactylon*, *P. rufescens*, and *Solorina crocea*. Weak pathogen or facultative saprobe.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Ortina River, 29.vi.1999, *O. V. Lavrinenko s.n.* (LE 233096). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96902b* (LE 233066b), *Zhurbenko 96961* (LE 233993); 18.vii.1996, *Zhurbenko 96959* (LE 233973), *Zhurbenko 96962* (LE 233963), *Zhurbenko 96328b* (LE 233841b). Cape Antseva, 19.vii.2000, *Matveeva s.n.* (LE 210406). Cape Baranova, 10.vii.1996, *Zhurbenko 96980* (LE 260069). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96960* (LE 233953); *Zhurbenko 96485b* (LE 260089b). Mount Ostraia, 11.vii.1996, *Zhurbenko 96904* (LE 233076), *Zhurbenko 96905* (LE 232807). – TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94177* (LE 206931), *Zhurbenko 94180* (LE 206932), *Zhurbenko 94181* (LE 206930), *Zhurbenko 94183* (UPS). North of Levinson-Lessinga Lake, 6.viii.1995, *Zhurbenko 95459* (LE 233744); 10.viii.1995, *Zhurbenko 95285* (LE 233056); 24.viii.1995, *Zhurbenko 95489b* (LE 233981b); 30.viii.1995, *Zhurbenko 95465* (LE 233964); *Zhurbenko 95464a* (LE 233894a). South of Levinson-Lessinga Lake, 30.vii.1995, *Zhurbenko 95458* (LE 233704); 31.vii.1995, *Zhurbenko 95462* (LE 233774); 28.viii.1995, *Zhurbenko 95460* (LE 233754), *Zhurbenko 95461* (LE 233764). Piasina River mouth, vii.1993, *Kuvaev s.n.* (LE 206929a, LE 206934a). – **REPUBLIC OF SAKHA (YAKUTIA).** Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98346a* (LE 233855a); 8.viii.1998, *Zhurbenko 98355* (LE 233954); *Zhurbenko 98357* (LE 233943). Samoĭlovskiĭ Island, 27.vii.1998, *Zhurbenko 98356* (LE 233904), *Zhurbenko 98102* (M; distributed in Microfungi Exsiccati (Triebel 2006)); 10.viii.1998, *Zhurbenko 98344* (LE 233775); 15.viii.1998, *Zhurbenko 98343* (LE 233755). Tiksi settlement, 24.viii.1998, *Zhurbenko 98348b* (LE 233874b). – **CHUKOTKA AUTONOMOUS AREA.** Bol'shoĭ Routan Island, 6.viii.1968, *Yurtsev s.n.* (LE 233734). Iskaten' Ridge, 6.viii.1967, *Voronova s.n.* (LE 233906); 28.vi.1971, *Makarova s.n.* (LE 232817). Ėgvekinot settlement, 21.vi.1970, *Makarova s.n.* (LE 233086). – WRANGEL ISLAND. Neizvestnaia River at its headwaters, 23.viii.1987, *Kholod s.n.* (LE 210417).

REPORTS. – Karatygin et al. (1999), Triebel (2006), Zhurbenko et al. (2002), Zhurbenko (2008, 2009a, 2009b), Zhurbenko & Santesson (1996).

***Arthonia stereocaulina* (Ohlert) R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (48). Medium-active. On thalli (phyllocladia, sometimes pseudopodetia) of *Stereocaulon alpinum*, *S. arcticum*, *S. botryosum*, *S. capitellatum*, *S. depressum*, *S. glareosum*, *S. groenlandicum*, *S. paschale*, *S. rivulorum*, *S. subcoralloides*, and *S. vesuvianum*. Commensal.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9746* (LE 206942), *Zhurbenko 9762* (LE 206954). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Scott Kelly Island, 25.vii.1930, *Savicz 1261* (LE 206936). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 24.vii.2007, *Zhurbenko 0718* (LE 210330). Ortina River, 29.vi.1999, *O. V. Lavrinenko s.n.* (LE 233437), *O. V. Lavrinenko s.n.* (LE 233484b). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. North of Aian Lake, 30.vii.1984, *Zhurbenko 84201* (LE 206941), 2.viii.1984, *Zhurbenko 84248* (LE 206950). Bunisiak River mouth, 11.vii.1984, *Zhurbenko 84245* (LE 206951). Kapchuk Lake, 17.vii.1985, *Zhurbenko 8583* (LE 206943); 25.vii.1985, *Zhurbenko 8578* (LE 206952), *Zhurbenko 8585* (LE 206945); 3.viii.1983, *Zhurbenko 83201* (LE 206956); 8.viii.1983, *Zhurbenko 83202* (LE 206937). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 9.vii.1996, *Zhurbenko 9690* (LE 206944); 10.vii.1996, *Zhurbenko 9667* (LE 206947); 11.vii.1996, *Zhurbenko 9677* (LE 206946), *Zhurbenko 96100* (LE 206948), *Zhurbenko 96101* (LE 206938); 13.vii.1996, *Zhurbenko 96108* (LE 206960). Ostantsovaia River, 12.vii.1996, *Zhurbenko 96947a* (LE 233407a). Mount Ostraia, 11.vii.1996, *Zhurbenko 96112c* (LE 233572c). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1994, *Zhurbenko 94503* (LE 233517). Krasnoe Lake, 16.viii.1995, *Zhurbenko 9519* (LE 233537), *Zhurbenko 95428* (LE 233477). North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 94504* (LE 233547). South of Levinson-Lessinga Lake, 28.vii.1994, *Zhurbenko 94504* (LE 233547); 28.viii.1995, *Zhurbenko 94504* (LE 233547); *Zhurbenko 9523* (LE 233447). Osipovka River, 18.vii.1990, *Zhurbenko 90828* (LE 233810); *Zhurbenko 90831a* (LE 233709a); *Zhurbenko 90839d* (LE 233729d). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90841* (LE 233830); *Zhurbenko 90832b* (LE 233930b). Ragozinka River, 11.vii.1990, *Zhurbenko 90373* (LE 207709). – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 9812* (LE 233497). Tiksi settlement, 17.vii.1998, *Zhurbenko 9837* (LE 233467), *Zhurbenko 9844* (H, LE 233597), *Zhurbenko 9846b* (LE 233541b); 24.viii.1998, *Zhurbenko 9821* (M), *Zhurbenko 9822* (LE 233577), *Zhurbenko 9848* (LE 233507). – **CHUKOTKA AUTONOMOUS AREA.** Mount Nauneson, 14.viii.1970, *Katenin s.n.* (LE 233587); Provideniia settlement, 3.vii.1969, *Afonina s.n.* (LE 206958); Uelen settlement, 8.viii.1975, *Makarova s.n.* (LE 206939). – WRANGEL ISLAND. Krasnyĭ Flag River, 20.viii.1938, *Gorodkov s.n.* (LE 233487, LE 233557); 1.viii.1997, *Kholod s.n.* (LE 206949).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2001, 2010a), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Arthonia triebeliae* Zhurb.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very rare (2). Low-active. On thalli of *Dactylina arctica* and *Flavocetraria cucullata*. Pathogen.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** Samoĭlovskiĭ Island, 30.vii.1998, *Zhurbenko 98105* (LE 308457, holotype; isotypes distributed in Microfungi Exsiccati (Triebel 2003)). Tit-Ary Island, 20.viii.1998, *Zhurbenko 9858* (GZU).

REPORTS. – Triebel (2003), Zhurbenko (2002a), Zhurbenko et al. (2002).

***Arthonia varians* (Dav.) Nyl.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Rare (4). Low-active. On *Lecanora rupicola* (apothecium discs). Pathogen.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 23.vi.1993, *Zhurbenko 9378* (LE). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 24.vii.1995, *Zhurbenko 95568* (LE 261704); 24.viii.1995, *Zhurbenko 95558* (LE 261725). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 19.vii.1998, *Zhurbenko 98400a* (LE 261604a).

REPORTS. – Zhurbenko (2002b, 2009b).

***Arthophacopsis parmeliarum* Hafellner**

CHARACTERIZATION. – Quite visible to the naked eye. Very rare (2). Low-active. On thalli of *Parmelia omphalodes* and *P. saxatilis*. Commensal or weak pathogen, gall-former.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Lavrentiia settlement, 29.vii.1973, *Makarova s.n.* (LE 232945, LE 233360a).

REPORT. – Zhurbenko (2009a).

***Bachmanniomyces punctum* (A.Massal.) Diederich & Pino-Bodas**

(= *Bachmanniomyces uncialicola* (Zopf) D. Hawksw.; ≡ *Phaeopyxis punctum* (A. Massal.) Rambold, Triebel & Coppins)

CHARACTERIZATION. – Sometimes visible to the naked eye. Infrequent (13). Medium-active. On thalli of *Cladonia amaurocraea*, *C. gracilis*, *C. pyxidata*, *C. rangiferina*, *C. stellaris*, *C. stygia*, and *C. subfurcata*. Commensal or possibly a weak pathogen, gall-former.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 24.vii.2007, *Zhurbenko 0737* (LE 210440), *Zhurbenko 0738* (LE 210500). – **YAMAL-NENETS AUTONOMOUS AREA.** Laborovaia settlement, 14.viii.2007, *Walker s.n.* (LE 210437). – **KRASNOYARSK TERRITORY.** Leskino settlement, 1972, *YUnak & Prokop'eva s.n.* (LE 308820). Sibiriakova Island, 31.vii.1989, *Kuvaev 1331* (LE 308785). – TAYMYR PENINSULA. North-west of Piasino Lake, 17.vii.1983, *Zhurbenko 83122* (LE 206957); 24.vii.1983, *Zhurbenko 8353* (LE 308903). Syrutaturku Lake, 18.vii.1994, *Pospelova s.n.* (LE 206959). – **REPUBLIC OF SAKHA (YAKUTIA).** Cherskiĭ settlement, 11.viii.2002, *Walker s.n.*. – **CHUKOTKA AUTONOMOUS AREA.** Ėnmil'veergin River, 12.viii.1951, *Ababkov s.n.* (LE 308754). Iskaten' Pass, vii.1967, *Voronova s.n.* (LE 308802). Ratmanova Island, 4.viii.1958, *Tikhomirov s.n.* (LE 308822a). – WRANGEL ISLAND. Sovetskaia River, 7.viii.1991, *Kholod s.n.* (LE 210385).

REPORTS. – Zhurbenko (1998, 2008), Zhurbenko & Pino-Bodas (2017), Zhurbenko & Pospelova (2001), Zhurbenko et al. (2005).

***Baliomyces taimyricus* Zhurb. & Diederich**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Amygdalaria elegantior* (thallus). Commensal or weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 10.viii.1995, *Zhurbenko 95590* (LE 310273, holotype).

REPORT. – Zhurbenko & Diederich (2024).

***Briancoppinsia cytospora* (Vouaux) Diederich, Ertz, Lawrey & van den Boom**

(≡ *Phoma cytospora* (Vouaux) D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Montanelia disjuncta* (thallus). Pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnaia River, 12.viii.1995, *Zhurbenko 95353* (LE 233220).

REPORT. – Zhurbenko (2009a).

***Bryostigma excentricum* (Th. Fr.) Etayo & Pino-Bodas**

(≡ *Arthonia excentrica* Th. Fr.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Frequent (30). Medium-active. On thalli of *Lepraria gelida*, *L. neglecta*, and *Lepraria* spp. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.vii.1997, *Zhurbenko 97348* (LE 233278). Olenka River mouth, 6.ix.1997, *Zhurbenko 97351* (LE 233268). Shel'pino Bay, 4.ix.1997, *Zhurbenko 97350* (LE 233289). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 24.vii.1930, *Savicz 1448bisa* (LE). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96113* (LE 206915), *Zhurbenko 96867* (LE 232793). Cape Antseva, 5.viii.1997, *Matveeva s.n.* (LE 207739). Cape Baranova, 15.vii.1996, *Zhurbenko 96868* (LE 232192); 21.vii.1996, *Zhurbenko 9693* (LE 206912), *Zhurbenko 96116* (LE 206913). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94126* (LE 206911), *Zhurbenko 94127b* (LE 207170b); 22.vii.1995, *Zhurbenko 95364* (LE 233224); 24.vii.1995, *Zhurbenko 95359* (LE 233307); 25.vii.1995, *Zhurbenko 95358b* (LE 233257b). South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95363* (LE 233196); 29.vii.1995, *Zhurbenko 95368* (LE 233187); 28.viii.1995, *Zhurbenko 95362* (LE 233157), *Zhurbenko 95367* (LE 233197). North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 83108* (LE 233318). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 23.vii.1998, *Cherkasova s.n.* (LE 233327); 30.vii.1998, *Zhurbenko 98295* (LE 233337). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98296* (LE 233237). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 11.vii.1979, *Makarova s.n.* (LE 233396a). Ioni Lake, 7.vii.1977, *Makarova s.n.* (LE 233216). Koliuchin Island, 5.viii.1969, *Plieva s.n.* (LE 233356). – WRANGEL ISLAND. Gusinaia River, 16.vii.1979, *Polozova s.n.* (LE 233277a); 5.viii.1991, *Kholod s.n.* (LE 210398). Neizvestnaia River at its

headwaters, 26.vii.1987, *Kholod s.n.* (LE 210415). Neizvestnaia River in its middle reaches, 1996, *Kholod s.n.* (LE 233206).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2008, 2009a), Zhurbenko & Santesson (1996).

***Capronia thamnoliae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On *Thamnolia vermicularis* var. *subuliformis* (thallus). Commensal or saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 24.viii.1994, *Zhurbenko 94373c* (LE 207477c); 26.viii.1995, *Zhurbenko 95583* (LE 260598). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95579* (LE 260390).

REPORT. – Zhurbenko (2012).

***Carbonea aggregantula* (Müll. Arg.) Diederich & Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (10). Medium-active. On thalli of *Lecanora intricata* and *L. polytropa* (mainly). Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Bell Island, 28.vii.1930, *Savicz 10274* (UPS), *Savicz 10267* (LE 206973). McClintock Island, 30.vii.1930, *Savicz 10297* (LE 206971). Scott Kelly Island, 25.vii.1930, *Savicz 92* (LE 206972). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 5.viii.1983, *Zhurbenko 83195* (LE 206974). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1995, *Zhurbenko 95565b* (LE 261624b). – **REPUBLIC OF SAKHA (YAKUTIA).** Tit-Ary Island, 17.vii.1988, *Makarova s.n.* (LE 261504b). YUryung-Kysam Tract, 13.viii.1997, *Cherkasova s.n.* (LE 261585). – **CHUKOTKA AUTONOMOUS AREA.** Ioni Lake, 5.vii.1977, *Makarova s.n.* (LE 261634). Televeem River, 19.vii.1979, *Makarova s.n.* (LE 261545).

REPORTS. – Zhurbenko (2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Carbonea supersparsa* (Nyl.) Hertel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (9). Low-active. On thalli of *Lecanora geophila*, *L. intricata*, *L. polytropa*, and *Myriolecis dispersa*. Commensal or weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 27.vii.1930, *Savicz 237* (UPS). McClintock Island, 30.vii.1930, *Savicz 10297* (LE 206975, UPS). Scott Kelly Island, 25.vii.1930, *Savicz 1273* (LE 206976). – **YAMAL-NENETS AUTONOMOUS AREA.** Sob' River, 24.vii.1986, *Zhurbenko 86110* (LE 232136); *Zhurbenko 86172* (LE 261694). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83192* (LE 206977). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 21.vii.1995, *Zhurbenko 95550* (LE 261607). South of Levinson-Lessinga Lake, 30.vii.1995, *Zhurbenko 95549* (LE 261786); 28.viii.1995, *Zhurbenko 95551* (LE 261766).

REPORTS. – Zhurbenko (2000, 2008, 2009b), Zhurbenko & Santesson (1996).

***Carbonea vitellinaria* (Nyl.) Hertel**

(≡ *Lecidea vitellinaria* Nyl.; ≡ *Nesolechia vitellinaria* (Nyl.) Rehm)

CHARACTERIZATION. – Sometimes visible to the naked eye. Frequent (33). Medium-active. On thalli, sometimes apothecia of *Candelariella kuusamoënsis*, *C. placodizans*, *C. vitellina*, *Lecanora polytropa* (rarely), saxicolous *Lecanora* sp. (rarely), and *Tephromela atra* (rarely). Commensal.

VOUCHERS. – **MURMANSK REGION.** Vaĭda-Guba in Pechenga settlement (collector and herbarium unknown). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 1930, *Savicz 17a* (LE 206986). Northbrook Island, 28.vii.1930, *Savicz s.n.* (LE 206979). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9335* (LE 260367); 27.vi.1993, *Zhurbenko 9393* (LE 261514); *Zhurbenko 93137* (LE 232135). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. North of Aian Lake, 1.viii.1984, *Zhurbenko 84211* (LE 206990); 9.viii.1984, *Zhurbenko 84208* (LE 206984); 16.viii.1984, *Zhurbenko 84130* (LE 206983); 24.viii.1984, *Zhurbenko 8484a* (LE 309307). Kapchuk Lake, 13.viii.1983, *Zhurbenko 83146* (LE 206987); 15.viii.1983, *Zhurbenko 83147* (LE 206988); 20.viii.1983, *Zhurbenko 83217* (LE 233013); 20.viii.1984, *Zhurbenko 83217* (LE 233013); 21.vii.1985, *Zhurbenko 8550* (LE 232963). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95315* (LE 233083); 25.vii.1995, *Zhurbenko 95318* (LE 232805); 29.vii.1994, *Zhurbenko 94124* (LE 206989); 26.viii.1995, *Zhurbenko 95317* (LE 232815). South of

Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95316* (LE 233093); 30.vii.1995, *Zhurbenko 95320* (LE 232903); 28.viii.1995, *Zhurbenko 95314* (LE 232973). North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 83137* (LE 206985). – **REPUBLIC OF SAKHA (YAKUTIA).** Khaia-YUriakh Tract, *Grosse s.n.* (LE 261544). Cape Krest-Tumsa, 13.viii.1987, *Perfil'eva s.n.* (LE 261794b). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 8.viii.1979, *Makarova s.n.* (LE 233003). Baranikha settlement, 16.vi.1971, *Makarova s.n.* (LE 233043). Iskaten' Ridge, 2.vii.1971, *Makarova s.n.* (LE 232883). Lavrentiia settlement, 16.vii.1973, *Makarova s.n.* (LE 232913). Uelen settlement, 8.viii.1975, *Makarova s.n.* (LE 232893), *Makarova s.n.* (LE 261683). Utaveem River, 3.viii.1991, *Katenin s.n.* (LE 206980). WRANGEL ISLAND. Somnitel'naia River, 1985, *Yurtsev s.n.* (LE 261764b).

REPORTS. – Räsänen (1943), Zhurbenko (1998, 2002b, 2008, 2009a, 2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Catillaria stereocaulorum* (Th. Fr.) H. Olivier**

(≡ *Scutula stereocaulorum* (Anzi) Körb.)

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very frequent (117). Highly-active. On thalli (phyllocladia, sometimes pseudopodetia or soralia) of *Stereocaulon alpestre*, *S. alpinum*, *S. botryosum*, *S. capitellatum* (soralia), *S. condensatum*, *S. depressum*, *S. glareosum*, *S. groenlandicum*, *S. paschale*, *S. rivulorum*, *S. saxatile*, *S. subcoralloides*, and *S. tomentosum*. Commensal or sometimes weak pathogen.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9736* (LE 207474), *Zhurbenko 9738* (LE 207475), *Zhurbenko 9739* (LE 207431), *Zhurbenko 9740* (LE 207412), *Zhurbenko 9742* (LE 207449), *Zhurbenko 9743* (LE 207463), *Zhurbenko 9772* (LE 207413). Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 9747* (LE 207439). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Alexandra Land, 29.vi.1959, *Alexandrova s.n.* (LE 233553). Hooker Island, 24.vii.1930, *Savicz 1442* (LE 207423); 12.viii.1979, *Safronova s.n.* (LE 207465). Scott Kelly Island, 25.vii.1930, *Savicz 218bis* (LE 207467), *Savicz 892b*, *Savicz 914b* (LE 207430), *Savicz 995b* (LE). – NOVAYA ZEMLYA. Mashigina Bay, 1921, *Lynge s.n.* (O). Matochkin Shar Strait, 1921, *Lynge s.n.* (O). – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 28.vi.1997, *O. V. Lavrinenko s.n.* (LE 310271); 24.vii.1999, *O. V. Lavrinenko s.n.* (LE 233661). Khar'iaga oilfield, 22.vii.2007, *Zhurbenko 0717* (LE 210387). Ortina River, 29.vi.1999, *O. V. Lavrinenko s.n.* (LE 233675). Seduiakha River, 3.viii.1998, *O. V. Lavrinenko s.n.* (LE 233651). – **YAMAL-NENETS AUTONOMOUS AREA.** Chugor'iakha River, 1991, *M. P. Andreev s.n.* (LE). Mount Rai-Iz, 23.viii.2001, *Kholod s.n.* (LE 233710b). Sob' River, 11.vii.1986, *Zhurbenko 8692* (LE 207706). – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko 90367* (LE 207698). Sibiriakova Island, 8.vii.1989, *Kuvaev s.n.* (LE 207418, 207452); 15.vii.1990, *Kuvaev s.n.* (LE 207461); 25.vii.1989, *Kuvaev s.n.* (LE 207479). Sverdrupa Island, 3.viii.1992, *Kozhevnikov s.n.* (LE 207422). – PUTORANA PLATEAU. North of Aian Lake, 3.viii.1984, *Zhurbenko 84237* (LE 207447); 4.viii.1984, *Zhurbenko 84250* (LE 207445). South of Aian Lake, 13.viii.1984, *Zhurbenko 84196* (LE 207434); 17.viii.1984, *Zhurbenko 84242* (LE 207448); 24.viii.1984, *Zhurbenko 84238* (LE 207450); 28.viii.1984, *Zhurbenko 84246a* (LE 207472a). Kapchuk Lake, 3.viii.1983, *Zhurbenko 8345* (LE 207446), *Zhurbenko 83199* (LE 207421), *Zhurbenko 83182a* (LE); 8.viii.1983, *Zhurbenko 83203* (LE 207469); 13.viii.1983, *Zhurbenko 83185* (LE 207417); 15.viii.1983, *Zhurbenko 83187* (LE 207419); 18.viii.1983, *Zhurbenko 83206* (LE 233573); 19.vii.1985, *Zhurbenko 8575* (LE 207459). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 15.vii.1996, *Zhurbenko 9672* (LE 207470), *Zhurbenko 9673a* (LE 207451a); 17.vii.1996, *Zhurbenko 9665a* (LE 207436a); *Zhurbenko 9680b* (LE 207164b); *Zhurbenko 9681* (LE 207480); *Zhurbenko 9682* (LE 207476); *Zhurbenko 9691* (LE 207478); *Zhurbenko 9694* (LE 207460); 18.vii.1996, *Zhurbenko 9663b* (LE 207105b), *Zhurbenko 96120* (LE 207456). Cape Antseva, 27.viii.1998, *Matveeva s.n.* (LE 233543). Cape Baranova, 9.vii.1996, *Zhurbenko 9687* (LE 207415); 11.vii.1996, *Zhurbenko 96104* (LE 207468), *Zhurbenko 9685* (LE 207420); 13.vii.1996, *Zhurbenko 9671* (LE 207437), *Zhurbenko 96110* (LE 207440); 15.vii.1996, *Zhurbenko 9669* (LE 207458); 21.vii.1996, *Zhurbenko 9684* (LE 207424), *Zhurbenko 9683* (LE 207473). Golysheva River, 6.viii.2000, *Matveeva s.n.* (LE 232170a). Studënaia River, 15.viii.1998, *Matveeva s.n.* (LE 233523). – TAYMYR PENINSULA. Bol'shaia Bootankaga River, 8.vii.1991, *Kuvaev s.n.* (LE 207735b); 22.vii.1991, *Kuvaev s.n.* (LE 207736); 29.vii.1991, *Kuvaev s.n.* (LE 207736). Cape Cheliuskina, 4.viii.1974, *Matveeva s.n.* (LE). Krasnoe Lake, 18.viii.1995, *Zhurbenko 9530* (LE 233533), *Zhurbenko 95434* (LE 233671). North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94134* (LE 207429); 24.viii.1994, *Zhurbenko 94361* (UPS); 20.vii.1995, *Zhurbenko 9532* (LE 233473), *Zhurbenko 9537* (LE 233403); 24.vii.1995, *Zhurbenko 95234* (LE 233413);

10.viii.1995, *Zhurbenko 9529* (LE 233493), *Zhurbenko 95237* (LE 233423), *Zhurbenko 9524* (LE 233472); 20.viii.1995, *Zhurbenko 9525* (LE 233433); 26.viii.1995, *Zhurbenko 95235* (LE 233483), *Zhurbenko 9521* (LE 233443); 30.viii.1995, *Zhurbenko 959* (LE 233632). Osipovka River, 18.vii.1990, *Zhurbenko 90839b* (LE 233729b). Piasina River mouth, 5.viii.1993, *Kuvaev s.n.* (LE 207427). Ragozinka River, 5.vii.1990, *Zhurbenko 90374* (LE 207708); 12.vii.1990, *Zhurbenko 90369b* (LE 207694b). Khatanga settlement, 4.ix.1995, *Zhurbenko 95241* (M), *Zhurbenko 9513a* (LE 233462a). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 9816* (LE 233591). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 9836* (LE 233621). Samoĭlovskiĭ Island, 9.viii.1998, *Zhurbenko 9820* (H, LE 233503); 15.viii.1998, *Zhurbenko 987* (LE 233631). Stolb Island, 12.viii.1998, *Zhurbenko 989*. Tit-Ary Island, 20.viii.1998, *Zhurbenko 9827* (LE 233691). Tiksi settlement, 17.vii.1998, *Zhurbenko 9838* (LE); 18.vii.1998, *Zhurbenko 9834* (LE 233681); 24.viii.1998, *Zhurbenko 9818* (LE 233463), *Zhurbenko 9819* (LE 233641). YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 9815* (LE 233601). – NEW SIBERIAN ISLANDS. Bennetta Island, 13.vii.1989, *Zhurbenko 8989* (LE 233513), *Zhurbenko 8971* (LE 207676); 18.vii.1989, *Zhurbenko 8974* (LE 207689); 19.vii.1989, *Zhurbenko 8979* (LE 207687); 4.viii.1989, *Zhurbenko 8982* (LE 207679); 16.viii.1989, *Zhurbenko 8978* (LE 207681). Zhokhova Island, 1989, *Samarskii s.n.* (LE 207442); 18.viii.1989, *Samarskii s.n.* (LE 207428, 207441); 31.viii.1989, *Samarskii s.n.* (LE 207435). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 5.vii.1979, *Makarova s.n.* (LE 207425). Gil'mymlineĭveem River, 23.vii.1977, *Makarova s.n.* (LE 207454). Inchoun settlement, 7.viii.1975, *Makarova s.n.* (LE 207457). Iskaten' Ridge, 12.viii.1971, *Katenin s.n.* (LE 207466); 14.viii.1971, *Makarova s.n.* (LE 207471a). Iul'tin settlement, 21.vii.1967, *unknown collector* (LE 233563). Kymyneĭveem River, 21.vii.1989, *Katenin s.n.* (LE 207464). Pitlekaĭ settlement, 1878–79, *Almquist s.n.* (S). – WRANGEL ISLAND. Komsomol Lake, 15.viii.1991, *Shtrik s.n.* (LE 233581).

REPORTS. – Andreev (1994), Karatygin et al. (1999), Keissler (1928), Samarskii et al. (1997), Vainio (1909), Zhurbenko (2000, 2001, 2002b, 2010a), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996), Zhurbenko et al. (2002).

***Cecidonia umbonella* (Nyl.) Triebel & Rambold**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Lecidea lapicida* (thallus). Commensal, gall-former.

VOUCHERS. – **CHUKOTKA AUTONOMOUS AREA.** Aniuĭskiĭ volcano, 9.viii.1982, *M. P. Andreev s.n.* (M). Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 207229a).

REPORTS. – Karatygin et al. (1999), Triebel (1989).

***Cecidonia xenophana* (Körb.) Triebel & Rambold**

(= *Lecidea melapsepha* Nyl.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Porpidia* (?) sp. (thallus). Commensal, gall-former.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Penkigneĭ Bay coast north of YAnrakynnot settlement, 1879, *Almquist s.n.* (H-Nyl, S).

REPORT. – Hertel & Andreev (2003).

***Cercidospora decolorella* (Nyl.) O.E. Erikss. & J.Z. Yue**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (7). Medium-active. On thalli of *Lecidoma demissum*, muscicolous *Mycobilimbia* sp., *Protopannaria pezizoides*, and terricolous algal crusts. Weak pathogen or saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 3.viii.1983, *Zhurbenko 83173* (LE 207001). – SEVERNAYA ZEMLYA. Ostantsovaia River, 12.vii.1996, *Zhurbenko* 96122 (LE 260308), *Zhurbenko* 96125 (LE 207637). – **REPUBLIC OF SAKHA (YAKUTIA).** NEW SIBERIAN ISLANDS. Zhokhova Island, 1989, *Samarskii s.n.* (LE 206991; as *C.* cf. *decolorella*); 23.vii.1989, *Samarskii s.n.* (LE 206981, LE 206993). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun, 30.vii.1975, *Makarova s.n.* (LE 309301).

REPORTS. – Zhurbenko (2002c), Zhurbenko & Hafellner (1999).

***Cercidospora epipolytropa* (Mudd) Arnold**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (14). Medium-active. On apothecia and thalli of *Lecanora geophila* and *L. polytropa*. Commensal or sometimes weak pathogen.

VOUCHERS. – **MURMANSK REGION.** 15 km N of Tumannyĭ settlement, 10.ix.1997, *Zhurbenko 97384* (LE 261644). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 28.vii.1986, *Zhurbenko 86113* (LE 261554). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Talnakh Region of Noril'sk city, 2.viii.1985, *Zhurbenko 8564* (LE 206994). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1994, *Zhurbenko 94296* (LE 206996). Krasnoe Lake, 18.viii.1995, *Zhurbenko 95553a* (LE 261677a). North of Levinson-Lessinga Lake, 20.viii.1995, *Zhurbenko 95554* (LE 261537), *Zhurbenko 952* (GZU, LE 206995, UPS; distributed in Fungi Lichenicoli Exsiccati (Santesson 1998)). South of Levinson-Lessinga Lake, 28.viii.1995, *Zhurbenko 95552* (LE 261796). – **REPUBLIC OF SAKHA (YAKUTIA).** Kunga Ridge, 3.ix.2000, *Kunitskiĭ s.n.* (LE 260154). Tiksi settlement, 3.ix.2000, *Kunitskiĭ s.n.* (LE). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 11.vii.1979, *Makarova* (LE 261525). – Lorino settlement, 6.vii.1972, *Makarova s.n.* (LE 261534). Sireniki settlement, 8.vii.1983, *Makarova s.n.* (LE 261784). – WRANGEL ISLAND. Somnitel'naia River, 1985, *Yurtsev s.n.* (LE 261764a).

REPORTS. – Santesson (1998), *Zhurbenko* (2002c, 2009b), *Zhurbenko* & Hafellner (1999).

***Cercidospora epithamnolia* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Low-active. On *Thamnolia vermicularis* var. *subuliformis* (thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 18.vii.1996, *Zhurbenko 961026* (LE 260574). Cape Baranova, 10.vii.1996, *Zhurbenko 96912* (LE 233044). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96908* (LE 232954, holotype). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95582* (LE 260490). – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Naskhok River, 29.viii.1998, *Kholod s.n.* (LE 260530, LE 260590).

REPORT. – Zhurbenko (2012).

***Cercidospora lecidomae* Zhurb. & Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (8). Low-active. On thalli, sometimes apothecia, of *Lecidoma demissum* (apothecia, thallus), *Tetramelas insignis*, and *T. papillatus*. Pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Ostantsovaia River, 12.vii.1996, *Zhurbenko 96123* (LE 207633), *Zhurbenko 96124* (LE 207636), *Zhurbenko 96126* (LE 207638), *Zhurbenko 96127* (LE 207639a), *Zhurbenko 96935* (LE 233244). Studënaia River, 16.viii.1998, *Matveeva s.n.* (LE 233385). – **CHUKOTKA AUTONOMOUS AREA.** Ioni Lake, 3.vii.1977, *Makarova s.n.* (LE 207632, M). Lavrentiia settlement, 22.viii.1975, *Makarova s.n.* (LE 207634).

REPORTS. – Zhurbenko (2009a), Zhurbenko & Triebel (2003).

***Cercidospora lobothalliae* Nav.-Ros. & Calat.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On *Lobothallia melanaspis* (apothecium discs, thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96921* (LE 233168). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96922* (LE 233158), *Zhurbenko 96923* (LE 233178).

REPORTS. – Zhurbenko (2009a, 2010c).

***Cercidospora ochrolechiae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (23). Medium-active. On apothecia and thalli of *Ochrolechia frigida* (including *O. inaequatula*), *O. grimmiae*, *O. upsaliensis*, muscicolous *Ochrolechia* sp., and *Pertusaria coriacea*. Commensal or sometimes weak pathogen.

VOUCHERS. – **MURMANSK REGION.** Olenka River mouth, 6.ix.1997, *Zhurbenko 97386* (LE 261772, holotype). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Alexandra Land Island,

14.vii.2019, *Konoreva 45* (LE F-350215). – NOVAYA ZEMLYA. Ledianaia Gavan' Bay, 1.ix. 1995, *Kuliev s.n.* (LE 261671). – **KRASNOYARSK TERRITORY.** Sibiriakova Island, 3.viii.1989, *Kuvaev s.n.* (LE 261691). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 15.vii.1996, *Zhurbenko 961020* (LE 261651); 17.vii.1996, *Zhurbenko 96864* (LE 232678); *Zhurbenko 96491* (LE 232162); 18.vii.1996, *Zhurbenko 96527* (LE 261501). Cape Antseva, 9.viii.1997, *Matveeva s.n.* (LE 261661). Cape Baranova, 12.vii.1996, *Zhurbenko 961021* (LE 261662). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96874* (LE 232565). Ostantsovaia River, 12.vii.1996, *Zhurbenko 96880* (LE 232604); *Zhurbenko 961018* (LE 261571). Mount Ostraia, 11.vii.1996, *Zhurbenko 961019* (LE 261621). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98263* (LE 261591). – **CHUKOTKA AUTONOMOUS AREA.** Enurmino settlement, 26.vii.1972, *Makarova s.n.* (LE 261581). Lavrentiia settlement, 9.viii.1969, *unknown collector* (LE 261531). Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 261511); 4.viii.1975, *Makarova s.n.* (LE 261521). Koliuchinskaia Bay, 3.viii.1980, *Katenin s.n.* (LE 261742). – WRANGEL ISLAND. Gusinaia River, 31.vii.1991, *Kholod s.n.* (LE 261512). Krasnyi Flag River, 31.viii.1998, *Kholod s.n.* (LE 261561); 1.ix.1997, *Kholod s.n.* (LE 232141). Wulfson Lagoon, 31.viii.1998, *Kholod s.n.* (LE 261761).

REPORTS. – Chesnokov & Konoreva (2023), Zhurbenko (2010c).

***Cercidospora parva* Hafellner & Ihlen**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (8). Low-active. On thalli of *Baeomyces placophyllus* and *B. rufus*. Commensal or weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 21.vii.2007, *Zhurbenko 0778b* (LE 310172). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 2.viii.1994, *Zhurbenko 94154a* (GZU, LE 207016a), *Zhurbenko 94155* (LE 207015), *Zhurbenko 94156* (UPS), *Zhurbenko 94157*. North-west of Piasino Lake, 8.viii.1999, *Zanokha s.n.* (LE 233214); Uboĭnaia River mouth, 9.viii.1990, *Zhurbenko 90734* (LE 260054); 10.viii.1990, *Zhurbenko 90735* (LE 260155).

REPORTS. – Czernyadjeva et al. (2021), Ihlen (1998), Zhurbenko (2009a, 2009b), Zhurbenko & Santesson (1996).

***Cercidospora punctillata* (Nyl.) R. Sant. s. lat.**

(= *Cercidospora lichenicola* (Zopf) Hafellner)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Frequent (78). Highly-active. On apothecia, thalli, sometimes cephalodia, of *Biatora cuprea*, *B. subduplex*, *Bryobilimbia hypnorum*, *Cladonia pocillum*, *C. pyxidata*, *Lecanora geophila*, *Lepraria gelida*, *Micarea assimilata*, *M. incrassata*, *Peltigera leucophlebia*, *Phaeorrhiza nimbosa*, *Pilophorus robustus* (cephalodia), *Protopannaria pezizoides*, *Psoroma hypnorum*, *P. tenue* var. *boreale*, *Solorina crocea*, *Sphaerophorus fragilis*, *S. globosus*, and *Tetramelas papillatus*. Pathogen or facultative saprobe.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97354b* (LE 233323b). Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9734* (LE 207000). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Alger Island, 1.viii.1930, *Savicz 1861* (LE 260168), *Savicz 1863* (LE 207008), *Savicz 1894* (LE 207012). Hooker Island, 24.vii.1930, *Savicz 432* (LE), *Savicz 442* (LE 207004), *Savicz 443* (LE 207007, UPS), *Savicz 445b* (LE 207003), *Savicz 449* (LE207009), *Savicz 473* (LE 207014), *Savicz 487* (LE 207011); 3.viii.1930, *Savicz s.n.* (LE 207013). Scott Kelty Island, 25.vii.1930, *Savicz 993a* (C). – **YAMAL-NENETS AUTONOMOUS AREA.** Belyĭ Island, 23.vii.2009, *Walker s.n.* (LE 261769). Mount Rai-Iz, 24.viii.2001, *Kholod s.n.* (LE 261751). – **KRASNOYARSK TERRITORY.** Sibiriakova Island, 14.vii.1990, *Kuvaev s.n.* (LE 233046). Vize Island, 14.viii.1930, *Savicz 1599bis* (LE 207002). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96897* (LE 232987), *Zhurbenko 96955b* (LE 233794b); 17.vii.1996, *Zhurbenko 96902a* (LE 233066a), *Zhurbenko 96937a* (LE 233223a); 18.vii.1996, *Zhurbenko 96895* (LE 232967), *Zhurbenko 96939* (LE 233253), *Zhurbenko 96954* (LE 233588). Cape Antseva, 1.viii.1997, *Matveeva s.n.* (LE 260136); 5.viii.1997, *Matveeva s.n.* (LE 207739); 6.viii.1997, *Matveeva s.n.* (LE 260026, LE 233156a); 18.viii.1998, *Matveeva s.n.* (LE 260076); 21.viii.1998, *Matveeva s.n.* (LE 260196a); 1.ix.1998, *Matveeva s.n.* (LE 233366, LE 233183). Cape Baranova, 10.vii.1996, *Zhurbenko 96893a* (LE 232937a), *Zhurbenko 96992b* (LE 260177); 12.vii.1996, *Zhurbenko 961001* (LE 260095); 13.vii.1996, *Zhurbenko 96953* (LE 233974), *Zhurbenko 961010a* (LE 261707a); 14.vii.1996, *Zhurbenko 96998* (LE 260156); 20.vii.1996, *Zhurbenko 96995* (LE 260276). Golysheva River, 4.viii.2000, *Matveeva s.n.* (LE 260206a, LE 260296);

7.viii.2000, *Matveeva s.n.* (LE 232152, LE 232130, LE 232145). Ostantsovaia River, 12.vii.1996, *Zhurbenko 96896* (LE 232887). Mount Ostraia, 11.vii.1996, *Zhurbenko 96899* (LE 232827), *Zhurbenko 96901* (LE 232837), *Zhurbenko 96996* (LE 260166), *Zhurbenko 961000* (LE 260245). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Krasnaia Bay, 6.viii.1985, *Gavrilo s.n.* (LE 232877). Cape Massivnyĭ, 16.viii.2007, *Gavrilo s.n.* (LE 232107). Mount Serp i Molot, 17.vii.1985, *Gavrilo s.n.* (LE 232927). – TAYMYR PENINSULA. Bikada River, vii.1989, *Pospelova s.n.* (LE 207005); 1998, *Pospelova s.n.* (LE 260087b). Bol'shaia Bootankaga River, 8.vii.1991, *Kuvaev s.n.* (LE 260147). Krasnoe Lake, 18.viii.1995, *Zhurbenko 95401a* (LE 233302a), *Zhurbenko 95553b* (LE 261677b). North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95283a* (LE 233007a), *Zhurbenko 95505* (LE 260176); 10.viii.1995, *Zhurbenko 95233* (LE 210482), *Zhurbenko 95284* (LE 232847); 22.viii.1995, *Zhurbenko 95492* (LE 233811). Ragozinka River, 12.vii.1990, *Zhurbenko 90697* (LE 260265); 13.vii.1990, *Zhurbenko 90701* (LE 260236). Uboĭnaia River mouth, 1.viii.1990, *Zhurbenko 90708* (LE 260226), *Zhurbenko 90852* (LE 232897); 10.viii.1990, *Zhurbenko 90709* (LE 260066); 11.viii.1990, *Zhurbenko 90710* (LE 260056). – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98274* (LE 232867). Tiksi settlement, 17.vii.1998, *Zhurbenko 98360* (LE 233783) – **CHUKOTKA AUTONOMOUS AREA.** Ėrguveem River, 7.vii.1970, *Makarova s.n.* (LE 260216). Gil'mymlineĭveem River, 30.vi.1977, *Makarova s.n.* (LE 232907). Lavrentiia settlement, 16.vii.1972, *Makarova s.n.* (LE 232957). Televeem River, 23.vii.1979, *Makarova s.n.* (LE 232857). – WRANGEL ISLAND. Gusinaia River, 9.ix.1991, *Kholod s.n.* (LE 210448). Klark River, 14.ix.1998, *Kholod s.n.* (LE 210400). Krasnyĭ Flag River, 1.ix.1997, *Kholod s.n.* (LE 210375). Sovetskaia River, 22.viii.1991, *Shtrik s.n.* (LE). Zapadnoe Plateau, 27.viii.1992, *Kholod s.n.* (LE 210359).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2001, 2008, 2009a, 2009b, 2023b), Zhurbenko & Alstrup (2004), Zhurbenko & Santesson (1996).

***Cercidospora soror* Obermayer & Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On thalli of *Arthrorhaphis alpina* and *Arthrorhaphis* sp. Commensal or weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96753* (LE 210320). – TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 30.vii.1995, *Zhurbenko 95231b* (LE 210493b).

REPORTS. – Zhurbenko (2007c, 2008).

***Cercidospora stereocaulorum* (Arnold) Hafellner**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Frequent (74). Medium-active. On thalli (phyllocladia, pseudopodetia, sometimes apothecia or cephalodia) of *Stereocaulon alpinum*, *S. arcticum*, *S. arenarium*, *S. botryosum*, *S. capitellatum*, *S. condensatum*, *S. depressum*, *S. glareosum*, *S. groenlandicum*, *S. intermedium*, *S. paschale*, *S. rivulorum*, *S. saxatile*, *S. subcoralloides*, *S. tomentosum*, *S. vesuvianum*, and *Stereocaulon* sp. Commensal or sometimes weak pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 9768* (LE 207046). Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9763* (LE 207048), *Zhurbenko 9764* (LE 207049), *Zhurbenko 9767* (LE 207033). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. George Land Island, 23.vii.2019, Chesnokov & Konoreva *s.n.* (LE). – **NENETS AUTONOMOUS AREA.** Ortina River, 29.vi.1999, *O. V. Lavrinenko s.n.* (LE 233504). – **YAMAL-NENETS AUTONOMOUS AREA.** Sob' River, 16.vii.1986, *Zhurbenko 8697* (LE); 17.vii.1986, *Zhurbenko 8696* (LE 207705), *Zhurbenko 8698* (LE 233583); 27.vii.1986, *Zhurbenko 8695* (LE 207704). – **KRASNOYARSK TERRITORY.** – PUTORANA PLATEAU. South of Aian Lake, 13.viii.1984, *Zhurbenko 84244b* (LE 207640b); 28.viii.1984, *Zhurbenko 84246b* (LE 207472b). Kapchuk Lake, 3.viii.1983, *Zhurbenko 83183* (LE 207028); 13.viii.1983, *Zhurbenko 83186* (LE 207029); 15.viii.1983, *Zhurbenko 83186* (LE 207029), *Zhurbenko 83188* (LE 207030); 25.vii.1985, *Zhurbenko 8579* (LE 207045), *Zhurbenko 8584* (LE 207047). Sobach'e Lake, vii.1996, *Matveeva s.n.* (LE 207018, LE 207021). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 9698* (LE 207050), *Zhurbenko 96130* (LE 207043). Cape Antseva, 16.vii.2000, *Matveeva s.n.* (LE 232167b); 19.vii.2000, *Matveeva s.n.* (LE 232159); 21.viii.1998, *Matveeva s.n.* (LE 233613). Cape Baranova, 9.vii.1996, *Zhurbenko 9686* (LE 207040), *Zhurbenko 9689* (LE 207055); 11.vii.1996, *Zhurbenko 9686a* (207054a), *Zhurbenko 96103* (LE 207041), *Zhurbenko 96105* (LE 207025), *Zhurbenko 96106* (LE 207032), *Zhurbenko 96119* (LE 207027); 13.vii.1996, *Zhurbenko 9670* (LE 207022), *Zhurbenko 96109*

(LE 233542), *Zhurbenko 96111* (LE 207035, M); 15.vii.1996, *Zhurbenko 9668* (LE 207024). Golysheva River, 5.viii.2000, *Matveeva s.n.* (LE 232119); 7.viii.2000, *Matveeva s.n.* (LE 232200). Mount Ostraia, 11.vii.1996, *Zhurbenko 96112b* (LE 233572b). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Cape Oloviannyĭ, 19.vi.1931, *Ushakov s.n.* (LE 207052). – TAYMYR PENINSULA. Bol'shaia Bootankaga River, 8.vii.1991, *Kuvaev s.n.* (LE 207740). Krasnaia River, 12.viii.1994, *Zhurbenko 94299* (LE 207020). North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9463* (LE 207017, UPS); 20.vii.1995, *Zhurbenko 9526* (LE), Zhurbenko *9533* (LE), *Zhurbenko 9536* (LE); 20.viii.1995, *Zhurbenko 9526* (LE 233623); 26.viii.1995, *Zhurbenko 95236* (LE 233633). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95433* (LE 233685). Osipovka River, 18.vii.1990, *Zhurbenko 90816* (LE 233820), *Zhurbenko 90839c* (LE 233729c). Piasina River mouth, 5.viii.1993, *Kuvaev s.n.* (LE 207019). North-west of Piasino Lake, 2.viii.1999, *Zanokha s.n.* (LE 233434). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90836* (LE 233840), *Zhurbenko 90832a* (LE 233930a). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 17.vii.1998, *Zhurbenko 9845* (LE 233643), *Zhurbenko 9851* (LE 233653); 18.vii.1998, *Zhurbenko 9833* (LE 233496); 24.viii.1998, *Zhurbenko 9831* (LE 233603), *Zhurbenko 986* (LE 233673) – NEW SIBERIAN ISLANDS. Bennetta Island, 10.vii.1989, *Zhurbenko 8987* (LE 233695); 11.vii.1989, *Zhurbenko 8988* (LE 233624); 12.vii.1989, *Zhurbenko 8976* (LE 207690). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 207034). Ioni Lake, 19.vii.1977, *Makarova s.n.* (LE 207031); 26.vii.1977, *Makarova s.n.* (LE 207051). Iskaten' Ridge, 29.vii.1971, *Katenin s.n.* (LE 207036); 14.viii.1971, *Makarova s.n.* (LE 207471b). Lavrentiia settlement, 11.vii.1973, *Makarova s.n.* (LE 207023). – WRANGEL ISLAND. Neozhidannaia River, 23.viii.1992, *Kholod s.n.* (LE 207026). Pravaia Gusinaia River, 30.vii.1996, *Kholod s.n.* (LE 207038). Tundrovaia River in its lower reaches, 9.viii.1996, *Kholod s.n.* (LE 207044). Ushakovskoe settlement, 14.viii.1972, *Mazing s.n.* (LE 207053). Verkhniaia Mamontovaia River, 28.vii.1996, *Kholod s.n.* (LE 207042).

REPORTS. – Chesnokov et al. (2022), Karatygin et al. (1999), Zhurbenko (2000, 2001, 2002b, 2010a), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Cercidospora thamnoliae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (16). Medium-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* (mostly) and *T. vermicularis* var. *vermicularis*. Saprobe or weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Seduiyakha River, 27.vii.1998, *O. V. Lavrinenko s.n.* (LE 232884). – **KRASNOYARSK TERRITORY.** Sverdrupa Island, 1.viii.1992, *Kozhevnikov s.n.* (LE 260483). – SEVERNAYA ZEMLYA. Sredniĭ Island, 25.viii.930, *Savicz 2048* (LE 207056). – BOL'SHEVIK ISLAND. Cape Baranova, 9.vii.1996, *Zhurbenko 96908* (LE 233034); 13.vii.1996, *Zhurbenko 96915* (LE 232844), *Zhurbenko 96918* (LE 232813), *Zhurbenko 961022* (LE 260583), *Zhurbenko 961028* (LE 260528). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96561* (LE 210306), *Zhurbenko 961023* (LE 260573). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 26.viii.1995, *Zhurbenko 95571* (LE 260533, holotype). – **REPUBLIC OF SAKHA (YAKUTIA).** NEW SIBERIAN ISLANDS. Zhokhova Island, 1989, *Samarskii s.n.* (LE 207223). – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Klark River, 11.viii.1998, *Kholod s.n.* (LE 232882). Naskhok River, 22.viii.1998, *Kholod s.n.* (LE 260570); 29.viii.1998, *Kholod s.n.* (LE 260600). Neozhidannaia River, 19.viii.1992, *Kholod s.n.* (LE 260374a).

REPORT. – Zhurbenko (2012); see also *Cercidospora thamnoliicola* in Erroneous and Doubtful Records.

***Cercidospora thamnoliicola* Ihlen**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* and *T. vermicularis* var. *vermicularis*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95580* (LE 260420). – **CHUKOTKA AUTONOMOUS AREA.** Provideniia settlement, 24.viii.2001, *Zhurbenko 01177* (LE 260440).

REPORT. – Zhurbenko (2012).

***Cercidospora trypetheliza* (Nyl.) Hafellner & Obermayer**

(= *Cercidospora arthrorhaphidicola* Alstrup; ≡ *Neonorrlinia trypetheliza* (Nyl.) Syd.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Low-active. On thalli of *Arthrorhaphis alpina*, *A. vacillans*, and *Arthrorhaphis* sp. Commensal or weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 2.viii.1930, *Savicz 11* (LE 207057). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 25.viii.1998, *Matveeva s.n.* (LE 232991). – TAYMYR PENINSULA. Krasnoe Lake, 16.viii.1995, *Zhurbenko 95340* (LE 232851). Syrutaturku Lake, 12.vii.1994, *Pospelova s.n.* (LE 207058). – **REPUBLIC OF SAKHA (YAKUTIA).** Tit-Ary Island, 20.viii.1998, *Zhurbenko 98290* (LE 233091).

REPORTS. – Zhurbenko (2009a), Zhurbenko & Pospelova (2001), Zhurbenko & Santesson (1996).

***Cercidospora verrucosaria* (Linds.) Arnold**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Low-active. On *Megaspora verrucosa* (apothecia, occasionally thallus). Commensal.

VOUCHERS. – **KOMI REPUBLIC.** Elets River, 29.vi.1993, *Zhurbenko 93197* (LE 260053). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Akhmatova Bay, 16.vii.1996, *Zhurbenko 96906* (LE 232856). Cape Antseva, 21.viii.1998, *Matveeva s.n.* (LE 233026). Cape Baranova, 15.vii.1996, *Zhurbenko 96905* (LE 232966). Ostantsovaia River, 12.vii.1996, *Zhurbenko 96871* (LE 232646).

REPORTS. – Zhurbenko (2008, 2009a, 2009b).

***Cercidospora xanthoriae* (Wedd.) R. Sant.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On *Rusavskia elegans* (apothecia, thallus). Commensal or weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95524* (LE 261608); 31.vii.1995, *Zhurbenko 95534* (LE 261668).

REPORT. – Zhurbenko (2009b).

***Chaenothecopsis parasitaster* (Bagl. & Carestia) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Cladonia sulphurina* (thallus). Pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Mount Gil'mymlineĭ, 2.vii.1977, *Makarova s.n.* (LE 308808).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Cladophialophora novozhilovii* Zhurb. & Diederich**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Psoroma hypnorum* (apothecia, thallus). Commensal.

VOUCHER. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Northbrook Island, 28.vii.1930, *Savicz 1998* (LE 310257, holotype).

REPORT. – Zhurbenko (2023a).

***Cladosporium licheniphilum* Heuchert & U. Braun**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Thamnolia vermicularis* var. *subuliformis* (thallus). Possibly a weak pathogen or saprobe.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.viii.1995, *Zhurbenko 95581* (HAL 2444 F, LE 260309).

REPORT. – Zhurbenko (2012).

***Clypeococcum bisporum* Zhurb.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very rare (2). Low-active. On *Flavocetraria cucullata* (thallus). Pathogen.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 9867* (LE 232768, holotype). Tit-Ary Island, 20.viii.1998, *Zhurbenko 9855* (GZU, LE 232622).

REPORT. – Zhurbenko (2009a).

***Clypeococcum cetrariae* Hafellner**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very rare (1). Low-active. On *Flavocetraria cucullata* (thallus). Pathogen.

VOUCHER. – **REPUBLIC OF SAKHA (YAKUTIA).** Tit-Ary Island, 20.viii.1998, *Zhurbenko 9858* (GZU, LE 232775).

REPORT. – Zhurbenko (2002a).

***Clypeococcum lenae* Zhurb.**

CHARACTERIZATION. – Sometimes visible to the naked eye. Very rare (1). Low-active. On *Solorina bispora* (thallus). Commensal, gall-former.

VOUCHER. – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98375* (LE 260229, holotype).

REPORT. – Zhurbenko (2020a).

***Clypeococcum placopsiphilum* Øvstedal & D. Hawksw.**

CHARACTERIZATION. – Sometimes visible to the naked eye. Very rare (1). Low-active. On *Placopsis gelida* (thallus). Commensal or weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95399* (LE 233293).

REPORT. – (Zhurbenko 2009a).

***Collemopsidium cephalodiorum* (Triebel & Grube) Grube**

(≡ *Cercidospora cephalodiorum* Triebel & Grube)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On cephalodia of *Pilophorus cereolus* and *P. dovrensis*. Commensal or weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Bunisiak River mouth, 14.vii.1984, *Zhurbenko 84312* (LE 210413). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 10.viii.1995, *Zhurbenko 95232* (LE 210472). – **CHUKOTKA AUTONOMOUS AREA.** Televeem River, 23.vii.1979, *Makarova s.n.* (LE 207146a).

REPORT. – Zhurbenko & Triebel (2005).

***Corticifraga fuckelii* (Rehm) D. Hawksw. & R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (5). Low-active. On thalli of *Peltigera* '*occidentalis*', *P. polydactylon*, and *P. rufescens*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** Leskino settlement, 6.viii.1972, *YUnak & Prokop'eva s.n.* (LE 233736). – **REPUBLIC OF SAKHA (YAKUTIA).** Cherskiĭ settlement, 11.viii.2002, *Walker s.n.* (LE). Samoĭlovskiĭ Island, 27.vii.1998, *Zhurbenko 98338* (LE 233776); 15.viii.1998, *Zhurbenko 98328* (LE 233827). Tit-Ary Island, 20.viii.1998, *Zhurbenko 98351* (LE 233854).

REPORTS. – Zhurbenko (2009b), Zhurbenko et al. (2005).

***Corticifraga fusispora* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (3). Low-active. On thalli of *Peltigera aphthosa* and *P. leucophlebia*. Pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95426* (LE 233677). – **REPUBLIC OF SAKHA (YAKUTIA).** Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98401* (LE 261643); 8.viii.1998, *Zhurbenko 98358* (LE 233983, holotype).

REPORT. – Zhurbenko (2009b).

***Corticifraga peltigerae* (Fuckel) D. Hawksw. & R. Sant.**

CHARACTERIZATION. – Quite visible to the naked eye. Frequent (29). Medium-active. On thalli (including soralia), occasionally apothecia, of *Peltigera canina*, *P. didactyla*, *P. extenuata*, *P. leucophlebia*, *P. malacea*, *P. membranacea*, *P.* '*occidentalis*', *P. rufescens*, *P. scabrosa*, and *Solorina crocea* (apothecia). Pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97362* (LE 233687). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Northbrook Island, 28.vii.1930, *Savicz 1748* (LE 207065). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield,

22.vii.2007, *Zhurbenko 0725* (LE 210418). Severnaia River, 14.viii.1996, *O. V. Lavrinenko s.n.* (LE 233538). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vii.1993, *Zhurbenko 9331* (LE). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Studënaia River, 14.viii.1998, *Matveeva s.n.* (LE 233976); 16.viii.1998, *Matveeva s.n.* (LE 233905). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Mount Serp i Molot, 17.vii.1985, *Gavrilo s.n.* (LE 233498). – TAYMYR PENINSULA. Bol'shaia Bootankaga River, 8.vii.1991, *Kuvaev s.n.* (LE 210366). Khatanga settlement, 4.ix.1995, *Zhurbenko 95425* (LE 233678), *Zhurbenko 95427* (LE 233697). Krasnaia River, 10.viii.1994, *Zhurbenko 94185* (LE 207062). North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9458* (UPS); 29.viii.1994, *Zhurbenko 9418* (LE 207063); 22.vii.1995, *Zhurbenko 95424* (LE 233428); 30.viii.1995, *Zhurbenko 95466* (LE 233994). South of Levinson-Lessinga Lake, 28.viii.1995, *Zhurbenko 95297* (LE 232836), *Zhurbenko 95452* (LE 233796). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95455* (LE 233936). – **REPUBLIC OF SAKHA (YAKUTIA).** Cherskiĭ settlement, 12.viii.2002, *Walker s.n.* (LE). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98340* (LE 233856). Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98346b* (LE 233855b); 8.viii.1998, *Zhurbenko 98336b* (LE 233956b), *Zhurbenko 98341* (LE 233875). Samoĭlovskiĭ Island, 27.vii.1998, *Zhurbenko 98339* (LE 233786). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 4.vii.1971, *Galanin s.n.* (LE 233726). Ioni Lake, 27.vi.1977, *Makarova s.n.* (LE 233986). Chegitun' River at its confluence with the Vetgyvaam River, 12.viii.1991, *Yurtsev s.n.* (LE 233866). – WRANGEL ISLAND. Neizvestnaia River in its middle reaches, 1996, *Kholod s.n.* (LE 233896).

REPORTS. – Zhurbenko (2002b, 2007a, 2008, 2009b), Zhurbenko & Santesson (1996), Zhurbenko et al. (2002, 2005).

***Corticifraga santessonii* Zhurb. & Zavarzin**

CHARACTERIZATION. – Sometimes visible to the naked eye. Very rare (1). Low-active. On *Lobaria linita* (thallus). Commensal or sometimes weak pathogen.

VOUCHER. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9324* (LE 210434).

REPORT. – Zhurbenko (2007a).

***Cryptodiscus cladoniicola* (D. Hawksw. & R. Sant.) Pino-Bodas, Zhurb. & S. Stenroos**

(≡ *Lettauia cladoniicola* D. Hawksw. & R. Sant.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Cladonia arbuscula* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 18.viii.1983, *Zhurbenko 83236* (LE 308897).

REPORT. – Pino-Bodas et al. (2017).

***Cryptodiscus epicladonia* Zhurb. & Pino-Bodas**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (5). Low-active. On thalli of *Cladonia amaurocraea*, *C. arbuscula*, and *C. uncialis*. Commensal or saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95598* (LE 308913). Osipovka River, 18.vii.1990, *Zhurbenko 901105* (LE 308498). – **CHUKOTKA AUTONOMOUS AREA.** Bol'shoĭ Aniuĭ River, 11.vii.1951, *V. N. Andreev s.n.* (LE 308795). Provideniia settlement, 3.vii.1969, *Safronov s.n.* (LE 308789). Utesiki settlement, 21.vii.1948, *Avramchik s.n.* (LE 308773a).

REPORT. – Pino-Bodas et al. (2017).

***Cryptodiscus galaninae* Zhurb. & Pino-Bodas**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On aged thallus of *Cladonia rangiferina*. Commensal or saprobe.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 25.vii.2007, *Zhurbenko 0735* (LE 210357).

REPORT. – Pino-Bodas et al. (2017); see also *Lettauia cladoniicola* in Erroneous and Doubtful Records.

***Dacampia engeliana* (Saut.) A. Massal.**

(≡ *Pleospora engeliana* (Saut.) G. Winter)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (10). Medium-active. On thalli of *Solorina bispora* and *S. saccata*. Pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Matochkin Shar Strait, 1921, *Lynge s.n.* (herbarium unknown). – **NENETS AUTONOMOUS AREA.** Seduiakha River, 3.viii.1998, *O. V. Lavrinenko s.n.* (LE 233882). – **KRASNOYARSK TERRITORY.** – PUTORANA PLATEAU. Kapchuk Lake, 25.vii.1985, *Zhurbenko 8563* (LE 207368). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96966* (LE 233773), *Zhurbenko 96969* (LE 233902). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9457* (LE 207074); 20.viii.1995, *Zhurbenko 95476* (LE 233893); 25.viii.1995, *Zhurbenko 95478* (LE 233823). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98370* (LE 260279). – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 20.vii.1977, *Makarova s.n.* (LE 233752b).

REPORTS. – Keissler (1928), Zhurbenko (2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Dacampia rufescentis* (Vouaux) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (4). Low-active. On thalli of *Peltigera lepidophora* and *P. rufescens*. Pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 22.vii.1995, *Zhurbenko 95443* (LE 233848), *Zhurbenko 95446* (LE 233828). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 16.vi.1971, *Makarova s.n.* (LE 233898). Bezymiannoe Lake, 7.vii.1979, *Makarova s.n.* (LE 233768).

REPORT. – Zhurbenko (2009b).

***Dacampia thamnoliicola* Zhurb. ad int.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Thamnolia vermicularis* var. *vermicularis* (thallus). Commensal or saprobe.

VOUCHER. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. Srednīĭ Island, 25.viii.1930, *Savicz 2017b* (LE 207531b).

REPORT. – Zhurbenko (2012).

***Didymellopsis* cf. *collematum* (J. Steiner) Grube & Hafellner**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On apothecium margins and thallus of *Enchylium polycarpon*. Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 23.vii.1994, *Zhurbenko 9480* (LE 207218).

REPORT. – Zhurbenko & Santesson (1996).

***Didymellopsis solorinae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli of *Solorina bispora* and S. *saccata*. Commensal or saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.viii.1995, *Zhurbenko 95482b* (LE 310194b, holotype); 30.viii.1995, *Zhurbenko 95481* (LE 233763).

REPORT. – Zhurbenko (2021c).

***Didymocyrtis bryonthae* (Arnold) Hafellner**

(= *Phoma denigricans* Hafellner; ≡ *Polycoccum bryonthae* (Arnold) Vězda)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (13). Medium-active. On apothecium discs of *Lecanora epibryon*. Pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Jackson Island, 27.vii.2019, *Konoreva 187*, *195* (LE F-350218). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. North of Aian Lake, 30.vii.1984, *Zhurbenko 84120* (LE 207370). – TAYMYR PENINSULA. Krasnoe Lake, 17.viii.1995, *Zhurbenko 95557* (LE 261795). – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus

cabin, 6.viii.1998, *Zhurbenko 9895* (LE 232766), *Zhurbenko 9896* (M). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98398* (LE 261735). Samoĭlovskiĭ Island, 28.vii.1998, *Zhurbenko 9871* (LE 261765). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 21.vi.1971, *Makarova s.n.* (LE 261535). Gil'mymlineĭveem River, 19.vii.1977, *Makarova s.n.* (LE 261675). Iskaten' Ridge, 29.vi.1971, *Makarova s.n.* (LE 261736b). Puoten settlement, 1.vii.1972, *Makarova s.n.* (LE 261506b). – WRANGEL ISLAND. Neizvestnaia River at its headwaters, 12.viii.1987, *Kholod s.n.* (LE 210408).

REPORTS. – Chesnokov & Konoreva (2023), Ertz et al. (2015), Zhurbenko (2008, 2009b), Zhurbenko & Hafellner (1999).

***Didymocyrtis consimilis* Vain.**

(= *Phoma caloplacae* D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (5). Low-active. On apothecium discs of *Bryonora castanea*, *Bryoplaca jungermanniae*, *Caloplaca cerina*, *C. stillicidiorum*, and *Lecanora geophila* (uncertain report, LE 261567). Pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95546* (LE 261567; as *Phoma* cf. *caloplacae*). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 11.vii.1979, *Makarova s.n.* (LE 233396b); 14.vii.1979, *Makarova s.n.* (LE 233092). Iskaten' Ridge, 20.vii.1971, *Makarova s.n.* (LE 232983). Sireniki settlement, 17.vii.1983, *Makarova s.n.* (LE 233063).

REPORTS. – Zhurbenko (2009a, 2009b); see also *Polycoccum bryonthae* in Erroneous and Doubtful Records.

***Didymocyrtis epiphyscia* Ertz & Diederich**

(= ? *Phoma epiphyscia* Vouaux; = *Phoma physciicola* Keissler)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (6). Low-active. On thalli, occasionally apothecia, of *Anaptychia bryorum*, *Physcia caesia*, *Physconia muscigena*, and *Rusavskia elegans* (apothecium discs). Weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95539* (LE 261787). South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95412* (LE 233409); 1.viii.1995, *Zhurbenko 95537* (LE 261648). Ragozinka River, 14.vii.1990, *Zhurbenko 90576*a (LE 261549a). – **CHUKOTKA AUTONOMOUS AREA.** Ėnmyvaam River, 30.vi.1980, *Makarova s.n.* (LE 233659b). Sireniki settlement, 8.vii.1986, *Katenin s.n.* (LE 233539).

REPORT. – Zhurbenko (2009b).

***Didymocyrtis peltigerae* (Fuckel) Hafellner**

(= ? *Phoma peltigerae* (P. Karst.) D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Peltigera leucophlebia* (thallus). Pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 24.viii.1995, *Zhurbenko 95488* (LE 233741).

REPORT. – Zhurbenko (2009b).

***Echinothecium reticulatum* Zopf**

(= *Sphaerellothecium reticulatum* (Zopf) Etayo)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (33). Medium-active. On thalli, occasionally apothecia, of *Arctoparmelia centrifuga*, *A. separata*, *Parmelia omphalodes*, *P. saxatilis*, and *P. sulcata*. Commensal or facultative saprobe.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9342* (LE). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96919* (LE 233051), *Zhurbenko* 96920 (LE 233399). – TAYMYR PENINSULA. Krasnoe Lake, 15.viii.1995, *Zhurbenko 95347* (LE 232921). North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 9495* (LE 207232); 21.vii.1995, *Zhurbenko 95343* (LE 232891); 6.viii.1995, *Zhurbenko 95346* (LE 232951); 24.viii.1995, *Zhurbenko 95349* (LE 233389); 30.viii.1995, *Zhurbenko 95348* (LE 233369). South of Levinson-Lessinga Lake, 29.vii.1995, *Zhurbenko 95350* (LE 233329); 31.vii.1995, *Zhurbenko 95352* (LE 233209); 28.viii.1995, *Zhurbenko 95344* (LE 232881). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95345* (LE 233001). Osipovka River, 18.vii.1990,

Zhurbenko 90519b (LE 260092b). Ragozinka River, 2.vii.1990, *Zhurbenko 90460* (LE 260233); 14.vii.1990, *Zhurbenko 90463* (LE 260222). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98291* (LE 233379). – NEW SIBERIAN ISLANDS. Kotel'nyĭ Island, Balyktakh River, 20.viii.1965, *Egorov s.n.* (LE 233240). – **CHUKOTKA AUTONOMOUS AREA.** Baran'e Lake, 22.vii.1980, *Makarova s.n.* (LE 233259). Baranikha settlement, 20.vi.1967, *Zimarskaia & Yurtsev s.n.* (LE 233339); 5.vii.1967, *Zimarskaia & Makarova s.n.* (LE 233150); 20.vi.1971, *Makarova s.n.* (LE 233180); 1971, *Galanin s.n.* (LE 233199). Inchoun settlement, 4.viii.1975, *Makarova s.n.* (LE 233320). Iskaten' Ridge, 31.vii.1971, *Makarova s.n.* (LE 233210). Lavrentiia settlement, 21.vii.1973, *Makarova s.n.* (LE 233319); 31.vii.1973, *Makarova s.n.* (LE 233160). Loren River, 13.viii.1972, *Makarova s.n.* (LE 232931); 16.viii.1972, *Makarova s.n.* (LE 233041). Lorino settlement, 7.vii.1972, *Makarova s.n.* (LE 233190). Pepenveem River, 10.vii.1970, *Makarova s.n.* (LE 233290a). Puoten settlement, 18.vii.1972, *Makarova s.n.* (LE 233169). Sireniki settlement, 15.vii.1986, *Katenin s.n.* (LE 233200).

REPORTS. – Zhurbenko (2002b, 2009a, 2009b), Zhurbenko & Santesson (1996).

***Endococcus collematis* Brackel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Enchylium polycarpon* (thallus). Commensal.

VOUCHER. – **KOMI REPUBLIC.** Elets River, 29.vi.1993, *Zhurbenko 93190* (LE 260778).

REPORT. – Zhurbenko (2022); see also *Endococcus pseudocarpus* in Erroneous and Doubtful Records.

***Endococcus hafellneri* (Zhurb.) Zhurb.**

(≡ *Stigmidium hafellneri* Zhurb.)

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very rare (1). Low-active. On *Flavocetraria cucullata* (thallus). Pathogen.

VOUCHER. – **REPUBLIC OF SAKHA (YAKUTIA).** Tit-Ary Island, 20.viii.1998, *Zhurbenko 9854* (GZU, isotype; LE 232546, holotype).

REPORT. – Zhurbenko (2009a).

***Endococcus nanellus* Ohlert**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (13). Medium-active. On apothecia (usually along their margin), cephalodia and thalli (phyllocladia, sometimes pseudopodetia) of *Stereocaulon alpinum*, *S. botryosum*, *S. condensatum*, and *S. tomentosum*. Commensal.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9735* (LE 207652). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 21.vii.2007, *Zhurbenko 0720* (LE 210436); 25.vii.2007, *Zhurbenko 0719* (LE 210388). – **YAMAL-NENETS AUTONOMOUS AREA.** IAmburg factoria, 18.viii.1931, *Mochalov s.n.* (LE 207668). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. South of Aian Lake, 28.viii.1984, *Zhurbenko 84247* (LE 207673). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Mount Ostraia, 11.vii.1996, *Zhurbenko 96112a* (LE 233572a). – TAYMYR PENINSULA. Bikada River, 1998, *Pospelova s.n.* (LE 261543). Khatanga settlement, 4.ix.1995, *Zhurbenko 9517*. North of Levinson-Lessinga Lake, 26.viii.1994, *Zhurbenko 94502* (LE 210421). Osipovka River, 18.vii.1990, *Zhurbenko 901150* (LE 233739). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90821* (LE 233980). Ragozinka River, 12.vii.1990, *Zhurbenko 90820* (LE 233780). – **REPUBLIC OF SAKHA (YAKUTIA).** Cherskiĭ settlement, 10.viii.2002, *Walker s.n.* (LE).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2001, 2010a), Zhurbenko & Triebel (2008), Zhurbenko et al. (2005).

***Endococcus perpusillus* Nyl. s. lat.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (13). Medium-active. On thalli of *Bilimbia lobulata*, *Rhizocarpon eupetraeoides*, *R. geographicum*, and *R.* '*obscuratum*'. Commensal or sometimes weak pathogen.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Sob' River, 17.vii.1986, *Zhurbenko 86133* (LE 261669); 24.vii.1986, *Zhurbenko 86170* (LE 261670). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 11.viii.1982, *Titov s.n.* (LE). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 23.vii.1994, *Zhurbenko 9482* (LE 207235); 25.viii.1994, *Zhurbenko 94428* (LE 207237); 26.viii.1995, *Zhurbenko 95521* (LE 261550). – **REPUBLIC OF SAKHA (YAKUTIA).** Bulunkan-Khaiata Tract, 23.vii.1988, *Makarova s.n.* (LE 261529a). – **CHUKOTKA AUTONOMOUS**

AREA. Ėgvekinot settlement, 21.vi.1970, *Makarova s.n.* (LE 261729, LE 261539); 25.vi.1970, *Makarova s.n.* (LE 261539). Ėnmyvaam River, 3.vii.1980, *Makarova s.n.* (LE 261780); 10.vii.1980, *Makarova s.n.* (LE 261520). Mount Nauneson, 26.vii.1970, *Katenin s.n.* (LE 261799). – WRANGEL ISLAND. Gusinaia River, 24.viii.1991, *Shtrik s.n.* (LE 260264).

REPORTS. – Zhurbenko (2000, 2009b), Zhurbenko & Santesson (1996).

***Endococcus propinquus* (Körb.) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (15). Medium-active. On thalli of *Aspicilia* sp., *Porpidia flavicunda*, *P. melinodes*, *Protoparmelia* sp., and *Verrucaria aethiobola*. Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Bell Island, 28.vii.1930, *Savicz s.n.* (LE 207248). Hooker Island, 1.viii.1930, *Savicz s.n.* (LE 207249); 2.viii.1930, *Savicz s.n.* (LE 207247, LE 207250b). – NOVAYA ZEMLYA. Mashigina Bay, 1921, *Lynge s.n.* (herbarium unknown). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9347* (LE 308602), *Zhurbenko 9352* (LE 308603). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 5.viii.1983, *Zhurbenko 83190* (LE 207239); 17.vii.1985, *Zhurbenko 8565* (LE 207243). Talnakh Region of Noril'sk city, 2.viii.1985, *Zhurbenko 8567* (LE 207246), *Zhurbenko 8568* (LE 207245), *Zhurbenko 8571* (LE 207242). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9456* (LE 207240); 6.viii.1994, *Zhurbenko 94158* (LE 207241). – **CHUKOTKA AUTONOMOUS AREA.** Bol'shoĭ Peledon River, 30.vii.1982, *M. P. Andreev s.n.* (M). Kymyneĭveem River, 30.vii.1989, *Katenin s.n.* (LE 261789a).

REPORTS. – Lynge (1928), Triebel (1989), Zhurbenko (2002b, 2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Endococcus rugulosus* Nyl. s. lat.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (15). Medium-active. On thalli, rarely apothecia of *Agonimia tristicula*, *Amygdalaria consentiens*, *A. elegantior*, *A. panaeola*, *A. pelobotryon*, *Aspicilia hyperboreorum*, *Aspicilia* spp. (apothecia), *Rhizocarpon eupetraeoides*, *R. geminatum*, *R. geographicum*, *R. sorediosum*, and *Stereocaulon plicatile*. Commensal or sometimes weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 2.viii.1930, *Savicz s.n.* (LE 207260a). – **YAMAL-NENETS AUTONOMOUS AREA.** Baĭdaratskaĭa Bay coast E of Ngoiuiakha River mouth, 28.vii.2007, *Zhdanov s.n.* (LE 260728). Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93110b* (LE 261709b). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. South of Aian Lake, 29.viii.1984, *Zhurbenko 84201* (GZU). Kapchuk Lake, 28.vii.1982, *Titov s.n.* (LE 207251); 3.viii.1983, *Zhurbenko 83154* (LE 207255); 18.viii.1983, *Zhurbenko 83218* (LE 232911); 19.vii.1985, *Zhurbenko 8561* (LE 207258); 25.vii.1985, *Zhurbenko 8568* (LE 207261). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Predgornoe Lake, vii.1992, *Kotlov s.n.* (LE). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1994, *Zhurbenko* 94304 (LE 207253), *Zhurbenko 94260* (LE 207254), *Zhurbenko 94298* (LE 207257). North of Levinson-Lessinga Lake, 24.viii.1994, *Zhurbenko 94388* (LE 207256). North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 83136* (LE 207252). Syrutaturku Lake, 1994, *Pospelova s.n.* (LE). — **CHUKOTKA AUTONOMOUS AREA.** Ėgvekinot settlement, 25.vi.1970, *Makarova s.n.* (LE 232901); 1970, *Makarova s.n.* (LE 261660). Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 261519, LE 261589, LE 261679a). Ioni Lake, 3.vii.1977, *Makarova s.n.* (LE 232871). Iskaten' Ridge, 1.vii.1971, *Makarova s.n.* (LE 261719). Kymyneĭveem River, 30.vii.1989, *Katenin s.n.* (LE 261789b). Sireniki settlement, 9.vii.1983, *Makarova s.n.* (LE 261600).

REPORTS. – Alstrup (2004), Karatygin et al. (1999), Zhurbenko (1998, 2009a, 2009b, 2010a), Zhurbenko & Hafellner (1999), Zhurbenko & Pospelova (2001), Zhurbenko & Santesson (1996), Zhurbenko & Zhdanov (2013).

***Endococcus stigma* (Körb.) Stizenb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Rhizocarpon geographicum* (thallus). Commensal.

VOUCHER. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9345* (LE 308601).

REPORT. – Zhurbenko (2002b).

***Endococcus verrucosus* Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Aspicilia* sp. (apothecia, thallus). Commensal or sometimes weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Bunisiak River mouth, 12.vii.1984, *Zhurbenko 84155* (LE 207262).

REPORT. – Zhurbenko & Notov (2015).

***Epibryon conductrix* (Norman) Nik. Hoffm. & Hafellner**

(= *Stigmidium catapyrenii* Cl. Roux & Triebel)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On thalli of *Catapyrenium cinereum*, *C. daedaleum*, and *Catapyrenium* sp. Commensal or sometimes weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83156* (LE 207511). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96928* (LE 233377). Cape Antseva, 16.viii.1997, *Matveeva s.n.* (LE 232825a). – TAYMYR PENINSULA. Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90560* (LE 260163).

REPORTS. – Zhurbenko (2009a, 2009b), Zhurbenko & Hafellner (1999).

***Epibryon solorinae* (Vain.) Nik. Hoffm. & Hafellner**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On thalli, occasionally apothecia, of *Solorina bispora* var. *bispora*, *S. bispora* var. *subspongiosa*, and *S. saccata*. Commensal or weak pathogen.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98374* (LE 260270). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98369* (LE 260190). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 7.viii.1975, *Makarova s.n.* (LE 233922). Lavrentiia settlement, 23.vii.1973, *Makarova s.n.* (LE 233762).

REPORT. – Zhurbenko (2009b).

***Epicladonia sandstedei* (Zopf) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (8). Low-active. On thalli of *Cladonia gracilis*, *C. pocillum*, *C. pyxidata*, *C. stricta*, *C. trassii*, and *Cladonia* sp. Commensal, gall-former.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 24.vii.2007, *Zhurbenko 0739b* (LE 308553). – **KOMI REPUBLIC.** Elets River, 28.vi.1993, *Zhurbenko 93218* (LE 232190). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North-west of Piasino Lake, 17.vii.1983, *Zhurbenko 8350* (LE 207265); 11.vii.1999, *Zanokha s.n.* (LE). Ragozinka River, 24.vii.1990, *Zhurbenko 90475* (LE 308561). Uboĭnaia River mouth, 3.viii.1990, *Zhurbenko 90385* (LE 308572). – **CHUKOTKA AUTONOMOUS AREA.** Provideniia settlement, 23.viii.2001, *Zhurbenko 0189* (LE 308559). – WRANGEL ISLAND. Klark River, 24.viii.1998, *Kholod s.n.* (LE 308581).

REPORTS. – Zhurbenko (1998, 2008), Zhurbenko & Alstrup (2004), Zhurbenko & Pino-Bodas (2017).

***Epicladonia simplex* D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Cladonia coccifera* (thallus). Commensal of sometimes weak pathogen.

VOUCHER. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 10.ix.2001, *Kholod s.n.* (LE 308573).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Epicladonia stenospora* (Harm.) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Medium-active. On thalli of *Cladonia amaurocraea*, *C. coccifera*, *C. squamosa*, and *Cladonia* sp. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97414* (LE 308911). – **NENETS AUTONOMOUS AREA.** Ortina River, 30.vi.1999, *O. V. Lavrinenko s.n.*

(LE 308929). – **YAMAL-NENETS AUTONOMOUS AREA.** Laborovaia settlement, 18.viii.2007, *Walker s.n.* (LE 210488). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Syrutaturku Lake, 1.viii.1994, *Pospelova s.n.* (LE 207267). – **CHUKOTKA AUTONOMOUS AREA.** Lavrentiia settlement, 22.viii.1975, *Makarova s.n.* (LE 308827).

REPORTS. – Zhurbenko (2008), Zhurbenko & Pospelova (2001), Zhurbenko & Pino-Bodas (2017).

***Epilichen stellatus* Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Lecidea* aff. *tessellata* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Bol'shoĭ Peledon River, 1.viii.1982, *M. P. Andreev s.n.* (M, holotype; UPS, isotype).

REPORT. – Triebel (1989).

***Epithamnolia karatyginii* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* and *T. vermicularis* var. *vermicularis*. Commensal or saprobe.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 97396* (LE 260448). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND, Cape Baranova, 13.vii.1996, *Zhurbenko 96916* (LE 232933). TAYMYR PENINSULA. Krasnoe Lake, 16.viii.1995, *Zhurbenko 95306b* (LE 232994b). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 17.vii.1998, *Zhurbenko 98407b* (LE 260444b).

REPORTS. – Suija et al. (2018a), Zhurbenko (2012).

***Epithamnolia longicladoniae* (Diederich & van den Boom) Diederich & Suija**

(≡ *Hainesia longicladoniae* Diederich & van den Boom)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Cladonia coccifera* (apothecium discs). Possibly a commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** Sibiriakova Island, 22.vii.1989, *Kuvaev 1307* (LE 308828).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Epithamnolia pertusariae* (Etayo & Diederich) Diederich & Suija**

(= *Hainesia bryonorae* Zhurb.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Cladonia macroceras* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. Ragozinka River, 4.vii.1990, *Zhurbenko 90100* (LE 308576).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Epithamnolia xanthoriae* (Brackel) Diederich & Suija s. lat.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On apothecia and apothecial stipes of *Baeomyces placophyllus* and *Dibaeis baeomyces*. Commensal.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 25.vii.2007, *Zhurbenko 0777* (LE 310174). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 6.viii.1983, *Zhurbenko 83234* (LE 233757).

REPORT. – Zhurbenko (2020b).

***Everniicola flexispora* D. Hawksw.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Rare (5). Low-active. On *Nephroma arcticum* (thallus). Pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97333* (LE 232896). Olenka River mouth, 7.ix.1997, *Zhurbenko 97360* (LE 233638). 15 km N of Tumannyĭ settlement, 19.viii.1997, *Zhurbenko 97334* (LE 232896). – **KRASNOYARSK TERRITORY**.

TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95292* (LE 232926). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 5.vii.1979, *Makarova s.n.* (LE 233155).

REPORTS. – Zhurbenko (2009a, 2009b).

***Geltingia associata* (Th. Fr.) Alstrup & D. Hawksw.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Infrequent (13). Medium-active. On thalli, occasionally apothecia, of *Ochrolechia* cf. *androgyna*, *O. frigida* (including *O. inaequatula*), terricolous *Ochrolechia* spp., and *Thamnolia vermicularis* var. *subuliformis*. Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Bell Island, 28.vii.1930, *Savicz 1318* (LE 207278); McClintock Island, 30.vii.1930, *Savicz 764* (UPS), *Savicz 291a* (LE 207279); Scott Kelly Island, 25.vii.1930, *Savicz 918* (LE 207276). – **YAMAL-NENETS AUTONOMOUS AREA.** Baĭdaratskaĭa Bay coast E of Ngoiuiakha River mouth, 30.vii.2007, *Zhdanov s.n.* (LE 260698a). Baĭdaratskaĭa Bay coast near IAraiakha River mouth, 6.viii.2007, *Zhdanov s.n.* (LE 260688). – **KRASNOYARSK TERRITORY.** Sibiryakova Island, 13.vii.1989, *Kozhevnikova s.n.* (LE 207272). Sverdrupa Island, 1.viii.1992, *Kozhevnikov s.n.* (LE 207273). Troĭnoĭ Island, 24.vii.1992, *Kozhevnikov s.n.* (LE 207271). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94128* (LE 207281); 20.viii.1995, *Zhurbenko 95307* (LE 233024), *Zhurbenko 95587* (LE 260468). Ragozinka River, 5.vii.1990, *Zhurbenko 90358* (LE 207274).

REPORTS. – Diederich et al. (2010), Kozhevnikov et al. (1994), Zhurbenko (2012), Zhurbenko & Santesson (1996), Zhurbenko & Zhdanov (2013).

***Graphium aphthosae* Alstrup & D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (8). Low-active. On thalli of *Peltigera aphthosa* and *P. leucophlebia*. Commensal or saprobe.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 29.vii.1930, *Demme s.n.* (LE 207282, LE 207283). – **KRASNOYARSK TERRITORY.** Leskino settlement, 15.viii.1972, *YUnak & Prokop'eva s.n.* (LE 233716b). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96949* (LE 233824); 18.vii.1996, *Zhurbenko 96948a* (LE 233864a). – TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95439a* (LE 233928a). – **REPUBLIC OF SAKHA (YAKUTIA).** Khas-Khatyn-Dzhiete cabin, 16.viii.1987, *Perfil'eva s.n.* (LE 233878). – **CHUKOTKA AUTONOMOUS AREA.** Kurupka River, 31.vii.1987, *Katenin s.n.* (LE 233868).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2009b), Zhurbenko & Santesson (1996).

***Hobsoniopsis santessonii* (Lowen & D. Hawksw.) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Peltigera scabrosa* (thallus). Commensal or weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 5.vii.1979, *Makarova s.n.* (LE 233797).

REPORT. – Zhurbenko (2009b).

***Homostegia piggotii* (Berk. & Broome) P. Karst.**

CHARACTERIZATION. – Quite visible to the naked eye. Very rare (1). Low-active. On *Parmelia omphalodes* (thallus). Weak pathogen.

VOUCHER. – **REPUBLIC OF SAKHA (YAKUTIA).** Ambarchik settlement, 16.viii.2002, *Walker s.n.* (LE).

REPORT. – Zhurbenko et al. (2005).

***Illosporium carneum* Fr.**

CHARACTERIZATION. – Sometimes visible to the naked eye. Infrequent (12). Medium-active. On thalli of *Peltigera aphthosa*, *P. didactyla*, *P. leucophlebia*, and *P. rufescens*. Commensal or weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Matochkin Shar Strait, 10.vii.1921, *Lynge s.n.* (herbarium unknown); 20.vii.1921, *Lynge s.n.* (herbarium unknown). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 22.vii.2007, *Zhurbenko 0726* (LE 210396); 25.vii.2007, *Zhurbenko 0724* (LE 210367). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 6.viii.1983, *Zhurbenko 83229* (LE 233757). – TAYMYR PENINSULA. Krasnaia River, 9.viii.1994,

Zhurbenko 94153 (LE 207285). North of Levinson-Lessinga Lake, 17.viii.1994, *Zhurbenko 94329* (UPS); 30.viii.1995, *Zhurbenko 95463* (LE 233934). South of Levinson-Lessinga Lake, 28.viii.1995, *Zhurbenko 95453* (LE 233966). — **REPUBLIC OF SAKHA (YAKUTIA).** Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98334* (LE 233777). Samoĭlovskiĭ Island, 27.vii.1998, *Zhurbenko 98333* (LE 233907). Tiksi settlement, 24.viii.1998, *Zhurbenko 98349* (LE 233804).

REPORTS. – Lind (1924), Zhurbenko (2008, 2009b), Zhurbenko & Santesson (1996).

***Intralichen lichenicola* (M.S. Christ. & D. Hawksw.) D. Hawksw. & M.S. Cole s. lat.**

(= *Bispora christiansenii* D. Hawksw.; = *Intralichen christiansenii* (D. Hawksw.) D. Hawksw. & M.S. Cole; ≡ *Trimmatostroma lichenicola* M.S. Christ. & D. Hawksw.)

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Rare (8). Medium-active. In the apothecium discs of *Caloplaca cerina*, saxicolous *Caloplaca* sp., *Candelariella arctica*, *C. aurella*, *C. vitellina*, *Lecania cyrtella*, corticolous *Lecanora* sp., *Protoblastenia rupestris*, and *Rinodina roscida*. Pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 2.viii.1930, *Savicz 17e* (LE 207589). – NOVAYA ZEMLYA. Ledianaia Gavan' Bay, 28.viii.1995, *Kuliev s.n.* (LE 232150b). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, viii.1983, *Zhurbenko 8344* (LE 206955). – SEVERNAYA ZEMLYA. OKTIABR'SKOĬ REVOLYUTSII ISLAND. Parizhskoĭ Kommuny Peninsula, 12.vii.1985, *Gavrilo s.n.* (LE 210350). – TAYMYR PENINSULA. East of Levinson-Lessinga Lake, 20.viii.1994, *Zhurbenko 94344a* (LE 207303a). – TAYMYR PENINSULA. North-west of Piasino Lake, vii.1983, *Zhurbenko s.n.* (LE). – **REPUBLIC OF SAKHA (YAKUTIA).** YUryung-Kysam Tract, 16.viii.1988, *Makarova s.n.* (LE 233372b). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 232873).

REPORTS. – Zhurbenko (1998, 2008, 2009a), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Knufia peltigerae* (Fuckel) Réblová & Unter.**

(≡ *Capronia peltigerae* (Fuckel) D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Peltigera malacea* (thallus). Commensal or saprobe.

VOUCHER. – TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95456* (LE 233785).

REPORT. – Zhurbenko (2009b).

***Lasiosphaeriopsis cephalodiorum* (Rostr.) Alstrup**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Amygdalaria panaeola* (cephalodia). Commensal or weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 28.vii.1982, *Titov s.n.* (LE 210373).

REPORTS. – Zhurbenko (2000), Zhurbenko & Triebel (2005).

***Lasiosphaeriopsis pilophori* Zhurb. & Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Pilophorus dovrensis* (cephalodia, thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83178* (LE 210442, holotype).

REPORT. – Zhurbenko & Triebel (2005).

***Lasiosphaeriopsis salisburyi* D. Hawksw. & Sivan.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli of *Peltigera rufescens* and *Peltigera* sp. Weak pathogen.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98325* (LE 233758). – **CHUKOTKA AUTONOMOUS AREA.** Pineĭveem River, 30.vii.1982, *Polozova* (LE 233808).

REPORT. – Zhurbenko (2009b).

***Lasiosphaeriopsis stereocaulicola* (Linds.) O.E. Erikss. & R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (75). Medium-active. On thalli (mostly pseudopodetia bases, occasionally phyllocladia) of *Stereocaulon alpinum*, *S. arcticum*, *S. arenarium*, *S. botryosum*, *S. condensatum*, *S. depressum*, *S. glareosum*, *S. groenlandicum*, *S. paschale*, and *S. rivulorum*. Commensal or sometimes weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 2.viii.1930, *Savicz 7* (LE 207129), *Savicz 11a* (LE 207131a); 11.viii.1979, *Safronova s.n.* (LE 207102). Scott Kelly Island, 25.vii.1930, *Savicz 892a* (LE 207132a), *Savicz 914a* (LE 207130, UPS), *Savicz 995a* (LE 207127a). – **YAMAL-NENETS AUTONOMOUS AREA.** Khasseinto-Se River, 6.vii.1927, *Gorodkov s.n.* (LE 233526). Mount Rai-Iz, 4.ix.2001, *Kholod s.n.* (LE 233602). Sob' River, 25.vii.1986, *Zhurbenko 8694* (LE 207703). – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko 90375* (LE 207707), *Zhurbenko 90893* (LE 233860). Sibiriakova Island, 8.vii.1989, *Kuvaev s.n.* (LE). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 15.vii.1996, *Zhurbenko 9673b* (LE 207451b); 17.vii.1996, *Zhurbenko 9665b* (LE 207436b), *Zhurbenko 9696* (LE 207116); 18.vii.1996, *Zhurbenko 9663a* (LE 207105a). Cape Antseva, 16.vii.2000, *Matveeva s.n.* (LE 232167a); 19.vii.2000, *Matveeva s.n.* (LE 210337); 23.vii.2000, *Matveeva s.n.* (LE 232186). Cape Baranova, 9.vii.1996, *Zhurbenko 9688* (LE 207113); 11.vii.1996, *Zhurbenko 9675a* (LE 207111a), *Zhurbenko 9676* (LE 207109), *Zhurbenko 9679* (LE 207106); 13.vii.1996, *Zhurbenko 96107* (LE 207114). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Goluboe Lake, 6.viii.1985, *Gavrilo s.n.* (LE 210383). Krasnaia Bay, 6.viii.1985, *Gavrilo s.n.* (LE 210383). Peschanaia River, 29.vii.1985, *Gavrilo s.n.* (LE 233446). – TAYMYR PENINSULA. Cape Cheliuskina, 4.viii.1974, *Matveeva s.n.* (LE 207104). Khatanga settlement, 4.ix.1995, *Zhurbenko 9513b* (LE 233462b). North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94135* (LE 207126); 20.vii.1995, *Zhurbenko 9535* (LE 233646). South of Levinson-Lessinga Lake, 31.vii.1994, *Zhurbenko 94135* (LE 207126); 20.vii.1995, *Zhurbenko 9535* (LE 233646); 31.vii.1995, *Zhurbenko 9514* (LE 233516). Osipovka River, 18.vii.1990, *Zhurbenko 90831b* (LE 233709b), *Zhurbenko 90839a* (LE 233729a). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90894* (LE 233970), *Zhurbenko 90907* (LE 233910). Ragozinka River, 3.vii.1990, *Zhurbenko 90371* (LE 207692); 12.vii.1990, *Zhurbenko 90369a* (LE 207694a). – PUTORANA PLATEAU. North of Aian Lake, 31.vii.1984, *Zhurbenko 84239* (LE 207120); 17.viii.1984, *Zhurbenko 84241* (LE 207110). Kapchuk Lake, 3.viii.1983, *Zhurbenko 83182b* (LE 207115b). Mount Kholokit, 7.viii.1967, *Lovelius s.n.* (LE 233476). Sobach'e Lake, vii.1996, *Matveeva s.n.* (LE 207117). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 17.vii.1998, *Zhurbenko 9843* (M); 18.vii.1998, *Zhurbenko 9833* (LE 233496); 24.viii.1998, *Zhurbenko 983* (LE 233406), *Zhurbenko 98322b* (LE 233452b). YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 984* (H, LE 233576). – NEW SIBERIAN ISLANDS. Bennetta Island, 8.vii.1989, *Zhurbenko 8968* (LE 207641); 10.vii.1989, *Zhurbenko 8980* (LE 207682); 11.vii.1989, *Zhurbenko 8970* (LE 207661), *Zhurbenko 8986*; 12.vii.1989, *Zhurbenko 8987* (LE 233626); 13.vii.1989, *Zhurbenko 8985* (LE 233686); 26.vii.1989, *Zhurbenko 8969* (LE 207646). Zhokhova Island, 23.vii.1989, *Samarskii s.n.* (LE 207122); 27.vii.1989, *Samarskii s.n.* (LE 207124); 18.viii.1989, *Samarskii s.n.* (LE 207123); 27.viii.1989, *Samarskii s.n.* (LE 207121). – **CHUKOTKA AUTONOMOUS AREA.** Chegitun' River at its confluence with the Vetgyvaam River, 13.viii.1991, *Makarova s.n.* (LE 207101). Iskaten' Ridge, 29.vii.1971, *Katenin s.n.* (LE 207118); 12.viii.1971, *Katenin s.n.* (LE 207112). Kymyneĭveem River, 12.vii.1989, *Katenin s.n.* (LE 207108). Kytep-Guiten'ryveem River, 18.viii.1977, *Petrovskiĭ s.n.* (LE 233416). Lavrentiia settlement, 29.vii.1973, *Makarova s.n.* (LE 207107). Penkigneĭ Bay coast at the mouth of the Pestsovaia River, 5.viii.1978, *Usenko s.n.* (LE 207103). Provideniia settlement, 3.vii.1969, *Afonina s.n.* (LE). – WRANGEL ISLAND. Gusinaia River, 5.viii.1991, *Shtrik s.n.* (LE 233666). Komsomol Lake, 16.viii.1991, *Kholod s.n.* (LE 233636). Krasnyĭ Flag River, 19.viii.1938, *Gorodkov s.n.* (LE 233466); 1.viii.1997, *Kholod s.n.* (LE). Neizvestnaia River in its middle reaches, 1986, *Dobrysh s.n.* (LE 233566). Neozhidannaia River, 14.viii.1992, *Kholod s.n.* (LE 233696).

REPORTS. – Karatygin et al. (1999), Samarskii et al. (1997), Zhurbenko (2000, 2002b, 2010a), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996), Zhurbenko & Triebel (2005).

***Lecanographa rinodinae* (Vězda) R. Sant.**

CHARACTERIZATION. – Sometimes visible to the naked eye. Very rare (1). Low-active. On *Phaeorrhiza nimbosa* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Ėnmyvaam River, 8.vii.1980, *Makarova s.n.* (LE 233262).

REPORT. – Zhurbenko (2009a).

***Lichenochora caloplacae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Caloplaca cerina* (apothecia, thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 17.viii.2000, *Matveeva s.n.* (LE 261350).

REPORT. – Zhurbenko & Brackel (2013).

***Lichenochora constrictella* (Müll. Arg.) Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (3). Low-active. On *Gyalolechia bracteata* (thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96731* (LE 232180). – **REPUBLIC OF SAKHA (YAKUTIA).** YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 98287* (LE 233022). – **CHUKOTKA AUTONOMOUS AREA.** Lavrentiia settlement, 17.vii.1973, *Makarova s.n.* (LE 232872).

REPORTS. – Zhurbenko (2008, 2009a).

***Lichenochora coppinsii* Etayo & Nav.-Ros. s. lat.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (10). Low-active. On thalli and prothalli of *Fuscopannaria praetermissa* and *Protopannaria pezizoides*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 23.vii.2000, *Matveeva s.n.* (LE 261563). Cape Baranova, 12.vii.1996, *Zhurbenko 961003* (LE 261583); 15.vii.1996, *Zhurbenko 96573* (LE 261523); 20.vii.1996, *Zhurbenko 961017* (LE 261763). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 9489* (LE 310251); 10.viii.1995, *Zhurbenko 95506* (LE 260135). Ragozinka River, 13.vii.1990, *Zhurbenko 90698* (LE 261513). Uboĭnaia River mouth, 1.viii.1990, *Zhurbenko 90706* (LE 261733); 3.viii.1990, *Zhurbenko 90723* (LE 261703). – **CHUKOTKA AUTONOMOUS AREA.** Televeem River, 22.vii.1979, *Makarova s.n.* (LE 261503).

REPORTS. – Zhurbenko (2009b, 2023a).

***Lichenochora elegantis* Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Rusavskia elegans* (thallus). Commensal or weak pathogen.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Dolgaia Bay, 23.viii.1998, *Shevchenko s.n.* (LE 261627).

REPORT. – Zhurbenko (2009b).

***Lichenochora lepidiotae* (Anzi) Etayo & Nav.-Ros. s. lat.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli of *Fuscopannaria praetermissa* and *Psoroma hypnorum*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 28.viii.1995, *Zhurbenko 95615* (LE 310252). Ragozinka River, 11.vii.1990, *Zhurbenko 90715* (LE 310253).

REPORT. – Zhurbenko (2023a).

***Lichenochora mediterraneae* Calat., Nav.-Ros. & E. Calvo**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Fuscopannaria praetermissa* (thallus). Commensal, gall-former.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95400a* (LE 233292a).

REPORT. – Zhurbenko (2009a).

***Lichenochora* cf. *polycoccoides* Hafellner & R. Sant.**

CHARACTERIZATION. – Sometimes visible to the naked eye. Very rare (3). Low-active. On *Physcia alnophila* (apothecia, thallus). Weak pathogen, gall-former.

VOUCHERS. – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 6.vii.1979, *Makarova s.n.* (LE 233509). Ėnmyvaam River, 15.vii.1980, *Makarova s.n.* (LE 233499). Mount Nauneson, 26.vii.1970, *Katenin s.n.* (LE 233569).

REPORT. – Zhurbenko (2009b).

***Lichenochora rinodinae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (12). Medium-active. On thalli, occasionally apothecia, of *Rinodina mniaraea*, *R. roscida*, and *R. turfacea*. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97379* (LE 261760, holotype). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Alger Island, 1.viii.1930, *Savicz 1842* (LE 207136). Hooker Island, 26.vii.1930, *Savicz 1415* (LE 207135). – **KOMI REPUBLIC.** Elets River, 29.vi.1993, *Zhurbenko 93189* (LE 261610). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9355* (LE 260710). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 13.vii.1996, *Zhurbenko 961008a* (LE 260141a); 15.vii.1996, *Zhurbenko 961007* (LE 260031). Mikoiana Bay, 21.vii.1996, *Zhurbenko 961006* (LE 260022). Skalistaia River, 25.viii.1998, *Matveeva s.n.* (LE 260760). – TAYMYR PENINSULA. West of Levinson-Lessinga Lake, 10.viii.1995, *Zhurbenko 95518* (LE 260291). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98387* (LE 261800). – **CHUKOTKA AUTONOMOUS AREA.** Iskaten' Ridge, 20.vii.1971, *Katenin s.n.* (LE 260799).

REPORT. – Zhurbenko (2013b).

***Lichenochora sedelnikoviorum* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Rostania ceranisca* (thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 15.vii.1996, *Zhurbenko 96779* (LE 310202, holotype). Mikoiana Bay, 21.vii.1996, *Zhurbenko 961036* (LE 310203).

REPORT. – Zhurbenko (2021b).

***Lichenochora weillii* (Werner) Hafellner & R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (3). Low-active. On *Physconia muscigena* (thallus). Commensal, occasional gall-former.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Scott Kelly Island, 25.vii.1930, *Savicz 207* (LE 207134). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Mikoiana Bay, 21.vii.1996, *Zhurbenko 96946a* (LE 233489a). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 22.viii.1995, *Zhurbenko 95419* (LE 233439).

REPORTS. – Zhurbenko (2009b), Zhurbenko & Santesson (1996).

***Lichenoconium erodens* M.S. Christ. & D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (5). Low-active. On thalli of *Cetraria islandica*, *Evernia perfragilis*, and *Parmelia omphalodes*. Pathogen or facultative saprobe.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Scott Kelly Island, 25.vii.1930, *Savicz 211* (LE 207139), *Savicz 988* (LE 207138), *Savicz 1289* (LE 207137). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95512b* (LE 260064b). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98393* (LE 261730).

REPORTS. – Zhurbenko (2009b), Zhurbenko & Santesson (1996).

***Lichenoconium lecanorae* (Jaap) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Frequent (38). Highly-active. On apothecium discs, sometimes thalli, of *Abrothallus parmeliarum* growing on *Parmelia* sp. s. str., *Allantoparmelia alpicola*, *Arctoparmelia centrifuga*, *Arctopeltis thuleana*, *Arthophacopsis*

parmeliarum growing on *Parmelia saxatilis*, *Asahinea chrysantha*, *Bryocaulon divergens*, *Bryonora castanea*, *Caloplaca stillicidiorum*, *Evernia perfragilis*, *Lecanora baicalensis*, *L. polytropa*, *L. sulphurea*, *L. symmicta*, *Lecanora* spp., *Melanelia hepatizon*, *M. stygia*, *Melanohalea septentrionalis*, *Protoparmeliopsis crustacea*, *Psoroma hypnorum*, *Ramalina almquistii*, *R. pollinaria*, *Rhizoplaca chrysoleuca*, *R. melanophthalma*, and *Sphaerophorus globosus*. Pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 21.viii.1997, *Zhurbenko 97353* (LE 233225); 22.viii.1997, *Zhurbenko 97352* (LE 233255). Olenka River mouth, 5.ix.1997, *Zhurbenko 97380* (LE 261690). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 23.vii.1930, *Savicz s.n.* (LE 207144), *Savicz 63a* (LE 207152a); 27.vii.1930, *Savicz 234* (LE 207148), *Savicz 250* (GZU, LE 207151, UPS). – NOVAYA ZEMLYA. Litke Bay, 1996, *Vekhov s.n.* (LE 261605). – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 25.vii.1999, *O. V. Lavrinenko s.n.* (LE 261695, LE 261715). Dolgaia Bay, 30.ix.1997, *Vekhov s.n.* (LE 261655). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9330* (LE), *Zhurbenko 9332* (LE); 27.vi.1993, *Zhurbenko 93120* (LE 261614). – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko* 90857 (LE 260213). Sibiriakova Island, 18.vii.1989, *Kuvaev s.n.* (LE 232669); 17.vii.1990, *Kuvaev s.n.* (LE 232677a). – PUTORANA PLATEAU. Kapchuk Lake, 2.viii.1982, *Titov s.n.* (LE); 1.viii.1983, *Zhurbenko 83222* (LE 233280); 15.viii.1983, *Zhurbenko 83174* (LE 207142). – TAYMYR PENINSULA. Krasnoe Lake, 15.viii.1995, *Zhurbenko* 95324 (LE 233053). North of Levinson-Lessinga Lake, 24.viii.1994, *Zhurbenko 94401* (LE 207147); 29.viii.1994, *Zhurbenko 9431* (LE 207149); 26.vii.1995, *Zhurbenko 95562b* (LE 261574b). North-west of Piasino Lake, 1.viii.1983, *Zhurbenko 8356* (LE 233219). Uboĭnaia River mouth, 1.viii.1990, *Zhurbenko 90722* (LE 310256). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 18.vii.1998, *Zhurbenko 98394* (LE 261510); 24.viii.1998, *Zhurbenko 98301* (LE 233285). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 15.viii.1979, *Makarova s.n.* (LE 261684). Baran'e Lake, 22.vii.1980, *Makarova s.n.* (LE 233153a); 6.viii.1980, *Makarova s.n.* (LE 261734). Enurmino settlement, 5.viii.1972, *Makarova s.n.* (LE 233245). Ioni Lake, 7.vii.1977, *Makarova s.n.* (LE 233349). Koliuchin Island, 5.viii.1965, *Plieva s.n.* (LE 232700). Kurupka River, 3.viii.1987, *Katenin s.n.* (LE 261617). Lavrentiia settlement, 29.vii.1973, *Makarova s.n.* (LE 233360b). Mount Nauneson, 7.viii.1970, *Katenin s.n.* (LE 233081). Pepenveem River, 10.vii.1970, *Makarova s.n.* (LE 233290b). – WRANGEL ISLAND. Somnitel'naia River, 14.viii.1986, *Polozova s.n.* (LE 261590a).

REPORTS. – Zhurbenko (2002b, 2008, 2009a, 2009b, 2023a), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Lichenoconium pyxidatae* (Oudem.) Petr. & Syd.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (6). Low-active. On thalli of *Cladonia chlorophaea*, *C. macroceras*, *C. pocillum*, and *C. pyxidata*. Commensal or sometimes weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Scott Kelly Island, 25.vii.1930, *Savicz 1268* (LE 207153). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 13.vii.1996, *Zhurbenko 96831* (LE). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98231* (LE). – **CHUKOTKA AUTONOMOUS AREA.** Kurupka River, 21.viii.1987, *Katenin s.n.* (LE 308812). Lavrentiia settlement, 22.viii.1975, *Makarova s.n.* (LE 308824). – WRANGEL ISLAND. Krasnyĭ Flag River, 18.vii.1997, *Kholod s.n.* (LE).

REPORTS. – Zhurbenko & Alstrup (2004), Zhurbenko & Pino-Bodas (2017), Zhurbenko & Santesson (1996).

***Lichenoconium usneae* (Anzi) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (6). Medium-active. On thalli, occasionally apothecia, of *Bryocaulon divergens*, *Cladonia rangiferina*, *Parmelia omphalodes*, *P. sulcata*, *Physcia alnophila*, and *Thamnolia vermicularis* var. *subuliformis*. Commensal or sometimes weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 1.ix.1930, *Demme s.n.* (LE 207155). Northbrook Island, 28.vii.1930, *Savicz 525* (LE 207154). – **NENETS AUTONOMOUS AREA.** Ortina River, 30.vi.1999, *O. V. Lavrinenko s.n.* (LE 233230). – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 29.vii.1995, *Zhurbenko 95603* (LE 309174). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha

settlement, 20.vi.1971, *Makarova s.n.* (LE 233300). Bezymiannoe Lake, 6.vii.1979, *Makarova s.n.* (LE 233689; as *L.* cf. *usneae*).

REPORTS. – Zhurbenko (2009a, 2009b, 2012), Zhurbenko & Pino-Bodas (2017), Zhurbenko & Santesson (1996).

***Lichenoconium xanthoriae* M.S. Christ.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Polycauliona polycarpa* (apothecia). Pathogen.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Ortina River, 27.vi.1999, *O. V. Lavrinenko s.n.* (LE 261587).

REPORT. – Zhurbenko (2009b).

***Lichenodiplis lecanorae* (Vouaux) Dyko & D. Hawksw.**

(≡ *Ascochytula lecanorae* (Vouaux) Keissl.; ≡ *Diplodia lecanorae* (Vouaux) Keissler)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On apothecium discs and thalli of *Caloplaca borealis*, *Calvitimela melaleuca*, '*Lecidea enteroleuca*', and '*Lecidea*' sp. Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Mashigina Bay, 1921, *Lynge s.n.* (O). Matochkin Shar Strait, 1921, *Lynge s.n.* (O). – **NENETS AUTONOMOUS AREA.** Pechora River, 13.viii.1998, *O. V. Lavrinenko s.n.* (LE 233033).

REPORTS. – Keissler (1928), Zhurbenko (2009a).

***Lichenodiplis lichenicola* Dyko & D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Rinodina septentrionalis* (apothecia). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Nikandrovskie Islands, 13.viii.1876, *Brenner s.n.* (UPS, holotype).

REPORT. – Hawksworth & Dyko (1979).

***Lichenopeltella cetrariicola* (Nyl.) R. Sant.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Arctocetraria andrejevii* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Mount Malyĭ Arėnaĭ, 6.viii.2012, *Lysenko s.n.* (LE 261433).

REPORT. – Zhurbenko & Zheludeva (2015).

***Lichenopeltella cladoniarum* E.S. Hansen & Alstrup**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On thalli of *Cladonia arbuscula*, *C. rangiferina*, *C. stellaris*, and *Cladonia* sp. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 21.viii.1997, *Zhurbenko 97420* (LE 308926). – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 25.vii.1990, *O. V. Lavrinenko s.n.* (LE 264347). Khar'iaga oilfield, 25.vii.2007, *Zhurbenko 0743* (LE 210390). – **CHUKOTKA AUTONOMOUS AREA.** Vel'ma (?) River, 15.vi.1939, *Trushkovskiĭ s.n.* (LE 308786).

REPORTS. – Zhurbenko (2008), Zhurbenko & Pino-Bodas (2017).

***Lichenopeltella peltigericola* (D. Hawksw.) R. Sant.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On thalli (mostly on their lower surface, including the rhizines) of *Peltigera leucophlebia*, *P. polydactylon*, and *P. rufescens*. Commensal. Sometimes on old lobes, but pathogenicity not observed.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97363* (LE 233798). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 22.vii.1995, *Zhurbenko 95444* (LE 233838). – **CHUKOTKA AUTONOMOUS AREA.** Sireniki settlement, 10.vii.1986, *Katenin s.n.* (LE 233825).

REPORT. – Zhurbenko (2009b).

***Lichenopeltella stereocaulorum* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (7). Low-active. On thalli (pseudopodetia bases, sometimes cephalodia or phyllocladia) of *Stereocaulon botryosum*, *S. depressum*, *S. groenlandicum*, *S. paschale*, and *S. rivulorum*. Commensal.

VOUCHERS. – **MURMANSK REGION.** 15 km N of Tumannyĭ settlement, 10.ix.1997, *Zhurbenko 97301* (LE 210392). Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9763* (LE 207651). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Bol'shaia Bootankaga River, 8.vii.1991, *Kuvaev s.n.* (LE 207735). North of Levinson-Lessinga Lake, 10.viii.1995, *Zhurbenko 956* (LE 233647a). – **REPUBLIC OF SAKHA (YAKUTIA).** Pokhodskoe settlement, 9.vii.1905, *Shul'ga s.n.* (LE 233627). – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Gusinaia River, 24.vii.1991, *Kholod s.n.* (LE 210362, holotype). Neozhidannaia River, 19.viii.1992, *Kholod s.n.* (LE 233617a).

REPORT. – Zhurbenko (2010a); see also *Lichenopeltella cladoniarum* in Erroneous and Doubtful Records.

***Lichenopuccinia poeltii* D. Hawksw. & Hafellner**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very rare (1). Low-active. On *Parmelia sulcata* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnoe Lake, 15.viii.1995, *Zhurbenko 95354* (LE 233350).

REPORT. – Zhurbenko (2009a).

***Lichenosticta alcicorniaria* (Linds.) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (9). Low-active. On thalli (mostly underside of basal squamules, occasionally podetia) of *Cladonia coccifera*, *C. cornuta*, *C. gracilis*, *C. pocillum*, and *C. sulphurina*. Commensal.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 18.vii.1999, *O. V. Lavrinenko s.n.* (LE). Khar'iaga oilfield, 21.vii.2007, *Zhurbenko 0741* (LE 210378); 22.vii.2007, *Zhurbenko 0740a* (LE 210435a); 24.vii.2007, *Zhurbenko 0732* (LE 210420), *Zhurbenko 0775* (LE 308568). Ortina River, 28.vi.1999, *O. V. Lavrinenko s.n.* (LE 308927, LE 308896). – **YAMAL-NENETS AUTONOMOUS AREA.** Laborovaia settlement, 17.viii.2007, *Walker s.n.* (LE 210475). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 5.vii.1979, *Makarova s.n.* (LE 308783b). Ėnmyvaam River, 1.vii.1980, *Makarova s.n.* (LE 308811).

REPORTS. – Zhurbenko (2008), Zhurbenko & Alstrup (2004), Zhurbenko & Pino-Bodas (2017).

***Lichenosticta dombrovskae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On thalli of *Stereocaulon alpinum* and *S. rivulorum*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Bol'shaia Bootankaga River, 10.vii.1991, *Kuvaev s.n.* (LE 207733, holotype; LE 207732).

REPORT. – Zhurbenko (2010a).

***Lichenostigma alpinum* (R. Sant., Alstrup & D. Hawksw.) Ertz & Diederich**

(≡ *Phaeosporobolus alpinus* R. Sant., Alstrup & D. Hawksw.)

CHARACTERIZATION. – Extensive infections are quite visible under a hand lens (10×). Frequent (46). Highly-active. Usually on thalli, sometimes apothecia and fruit warts, of *Lepra dactylina*, *Ochrolechia androgyna*, *O. frigida* (mostly), *O. upsaliensis*, terricolous *Ochrolechia* spp., and *Pertusaria coriacea*; occasionally on thalli (especially damaged areas with exposed core), rarely apothecia of *Anaptychia ciliaris* (erroneously reported as *A. ethiopica*), *Blastenia ammiospila*, *Cladonia arbuscula*, *C. cornuta*, *C. nipponica*, *C. pocillum*, *C. stricta*, *C. subcervicornis*, *Hypogymnia fistulosa*, *Lecanora luteovernalis*, *Melanohalea septentrionalis*, muscicolous *Ochrolechia* sp., *Parmelia sulcata*, *Physcia phaea*, *Physconia muscigena*, *Platismatia glauca*, *Sphaerophorus fragilis*, *S. globosus*, *Stereocaulon depressum*, *Stereocaulon* sp., and *Tetramelas geophilus*. Commensal or occasionally weak pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 21.viii.1997, *Zhurbenko 97357* (LE 233343). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 24.vii.1930, *Savicz 438b* (LE 207297b), *Savicz 458* (207358), *Savicz 1448bisa* (C); 3.viii.1930, *Savicz 554* (LE 207291), *Savicz s.n.* (LE 207355). McClintock Island, 30.vii.1930, *Savicz 291b* (LE 207354). Scott Kelly

Island, 25.vii.1930, *Savicz s.n.* (LE 308793). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 22.vii.2007, *Zhurbenko 0740b* (LE 210435b). Nenetz Ridge, 19.viii.1998, *O. V. Lavrinenko s.n.* (LE 233279). – **YAMAL-NENETS AUTONOMOUS AREA.** Baĭdaratskaĭa Bay coast E of Ngoiuiakha River mouth, 30.vii.2007, *Zhdanov s.n.* (LE 260698b). Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9325* (LE), *Zhurbenko 9337* (LE), *Zhurbenko 9343* (LE), *Zhurbenko 9360* (LE); 23.viii.2001, *Kholod s.n.* (LE 233720). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Bunisiak River mouth, 17.vii.1984, *Zhurbenko 84194* (LE 207295). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 16.vii.2000, *Matveeva s.n.* (LE 308546). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Cape Figurnyĭ, 12.vi.1931, *Ushakov 52* (LE 310272). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1995, *Zhurbenko 95411* (LE 233459). Krasnoe Lake, 17.viii.1995, *Zhurbenko 95409*b (LE 233549b). East of Levinson-Lessinga Lake, 19.viii.1994, *Zhurbenko 94336b* (LE 207299b). North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9453* (UPS), *Zhurbenko 9464* (LE 207353); 29.vii.1994, *Zhurbenko 94107* (LE 207293); 24.viii.1994, *Zhurbenko 94360* (LE 207357); 29.viii.1994, *Zhurbenko 9416a* (LE 207298a). South of Levinson-Lessinga Lake, 29.vii.1995, *Zhurbenko 95388* (LE 233364); 1.viii.1995, *Zhurbenko 95395* (LE 233243). North-west of Piasino Lake, 18.vii.1983, *Zhurbenko 83130* (LE 233330). Piasina River mouth, vii.1993, *Kuvaev* 1974 (LE 207300). Ragozinka River, 4.vii.1990, *Zhurbenko 90359* (GZU, LE 207352, UPS), *Zhurbenko 90362* (LE 207296); 5.vii.1990, *Zhurbenko 90358c* (LE 207274c); 13.vii.1990, *Zhurbenko 901002a* (LE 232144a). Syrutaturku Lake, 1994, *Pospelova s.n.* (LE). Uboĭnaia River mouth, 1.viii.1990, *Zhurbenko 901005a* (LE 232730a). – **REPUBLIC OF SAKHA (YAKUTIA).** Ambarchik settlement, viii.2002, *Walker s.n.* (LE). Tiksi settlement, 17.vii.1998, *Zhurbenko 98415* (LE 308919); 24.viii.1998, *Zhurbenko 9830* (LE 233532), *Zhurbenko 98265b* (LE 232649b). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 28.vii.1980, *Yurtsev s.n.* (LE 308818). Iskaten' Ridge, 20.vii.1971, *Makarova s.n.* (LE 233618). Lavrentiia settlement, 29.vii.1973, *Makarova s.n.* (LE 233269b). Sireniki settlement, 8.vii.1986, *Katenin s.n.* (LE 232582). Televeem River, 22.vii.1979, *Makarova s.n.* (LE 308821).

REPORTS. – Zhurbenko (1998, 2001, 2002b, 2008, 2009a, 2009b, 2010a), Zhurbenko & Hafellner (1999), Zhurbenko & Pino-Bodas (2017), Zhurbenko & Pospelova (2001), Zhurbenko & Santesson (1996), Zhurbenko & Zhdanov (2013), Zhurbenko et al. (2005).

***Lichenostigma elongatum* Nav.-Ros. & Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Lobothallia melanaspis* (apothecia, thallus). Commensal or weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Pravaia Uboĭnaia River, 6.viii.1990, *Zhurbenko 90557* (LE 260023).

REPORT. – Zhurbenko (2009b).

***Lichenostigma maureri* Hafellner**

(= *Phaeosporobolus usneae* D. Hawksw. & Hafellner)

CHARACTERIZATION. – Extensive infections are quite visible under a hand lens (10×). Infrequent (20). Medium-active. On thalli, including soralia, of *Evernia mesomorpha*, *E. perfragilis*, and *Ramalina pollinaria*. Commensal.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93122* (LE 260294). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. East of Levinson-Lessinga Lake, 20.viii.1994, *Zhurbenko 94342* (LE 207361); 9.viii.1995, *Zhurbenko 95512a* (LE 260064a). North of Levinson-Lessinga Lake, 24.vii.1995, *Zhurbenko 95514* (LE 260214); 20.viii.1995, *Zhurbenko 95511* (LE 260254); 26.viii.1995, *Zhurbenko 95510* (LE 260274). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95513* (LE 260224). – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1987, *Perfil'eva s.n.* (LE 260164). Tiksi settlement, 24.viii.1998, *Zhurbenko 98320* (LE 233371). YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 98386* (LE 260264). – **CHUKOTKA AUTONOMOUS AREA.** IAnrakynnot settlement, 23.vii.1976, *Sytin s.n.* (LE 260194); 18.viii.1978, *Sekretareva s.n.* (LE 260204). Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 261700). Lavrentiia settlement, 10.vii.1973, *Makarova s.n.* (LE 260044). Loren River, 15.viii.1972, *Makarova s.n.* (LE 260174). Mount Rėuneĭ, 8.viii.1938, *Trushkovskiĭ s.n.* (LE 261650). Sireniki settlement, 8.vii.1986, *Katenin s.n.* (LE 261750). – WRANGEL ISLAND. Gusinaia River, 1991, *Shtrik s.n.* (LE 260114). Somnitel'naia River, 1985, *Kholod s.n.* (LE 260284); 14.viii.1986, *Polozova s.n.* (LE 261590b).

REPORTS. – Zhurbenko (2009, 2009b), Zhurbenko & Santesson (1996).

***Lichenostigma semiimmersum* Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Buellia elegans* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95390* (LE 233344).

REPORT. – Zhurbenko (2009a).

***Lichenothelia rugosa* (G. Thor) Ertz & Diederich**

(≡ *Lichenostigma rugosum* G. Thor)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Diploschistes scruposus* (thallus, occasionally apothecia). Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97336* (LE 232905). – **CHUKOTKA AUTONOMOUS AREA.** Ėnmyvaam River, 8.vii.1980, *Makarova s.n.* (LE 232955).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2009a).

***Merismatium coccisporum* (Norman) Vouaux**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (9). Medium-active. On thalli of *Amygdalaria elegantior*, *A. panaeola*, *Amygdalaria* sp., *Cladonia pyxidata*, *Euopsis pulvinata*, *Lepraria* sp., and *Rhizocarpon umbilicatum*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83161b* (LE 207221b); 18.viii.1983, *Zhurbenko* 83221 (LE 232831). – TAYMYR PENINSULA. Dudinka town, 4.viii.1876, *Brenner s.n.* (S). North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94127a* (LE 207170a). – **CHUKOTKA AUTONOMOUS AREA.** IAnrakynnot settlement, 30.vii.1986, *Katenin s.n.* (LE 261594). Inchoun settlement, 4.viii.1975, *Makarova s.n.* (LE 207227b). Lavrentiia settlement, 16.vii.1972, *Makarova s.n.* (LE 207140b). Loren River, 16.viii.1972, *Makarova s.n.* (LE 207628a). Televeem River, 23.vii.1979, *Makarova s.n.* (LE 260073).

REPORTS. – Karatygin et al. (1999), Triebel (1989), Zhurbenko (2008, 2009a, 2009b), Zhurbenko & Pino-Bodas (2017), Zhurbenko & Santesson (1996).

***Merismatium decolorans* (Arnold) Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (10). Medium-active. On thalli, including cephalodia and soralia, of *Arthrorhaphis alpina*, *Cladonia pyxidata*, *Cladonia* sp., *Lecidoma demissum*, *Peltigera extenuata*, *P. leucophlebia*, *Stereocaulon alpinum*, *S. condensatum*, and *S. glareosum*; occasionally also on adjacent algal films on soil. Commensal.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9766* (LE 207656). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. North of Aian Lake, 30.vii.1984, *Zhurbenko 84202* (LE 207172). Kapchuk Lake, 6.viii.1983, *Zhurbenko 83237* (LE 308902); 15.viii.1983, *Zhurbenko 83145* (LE 207171). Sobach'e Lake, vii.1996, *Matveeva s.n.* (LE 207654). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96956* (LE 233834). – TAYMYR PENINSULA. Krasnoe Lake, 17.viii.1995, *Zhurbenko 95493* (LE 233761). North-west of Piasino Lake, 2.viii.1999, *Zanokha s.n.* (LE 210312). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98312* (LE 233322). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 7.vii.1979, *Makarova s.n.* (LE 233938).

REPORTS. – Zhurbenko (2000, 2001, 2009a, 2009b, 2010a), Zhurbenko & Hafellner (1999), Zhurbenko & Pino-Bodas (2017).

***Merismatium heterophractum* (Nyl.) Vouaux**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (19). Medium-active. On thalli, occasionally apothecia, of *Biatora subduplex*, *Biatora* sp., *Buellia epigaea*, *Cladonia pocillum*, *Cladonia* sp., *Lecanora epibryon*, *Lepraria* sp., *Lopadium pezizoideum*, *Peltigera* sp., *Rinodina turfacea*, *Rinodina* sp., and *Tetramelas insignis*. Commensal or facultative saprobe.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 11.vii.1999, *O. V. Lavrinenko s.n.* (LE 261640). – **YAMAL-NENETS AUTONOMOUS AREA.** Baĭdaratskaĭa Bay coast E of Ngoiuiakha River mouth, 27.vii.2007, *Zhdanov s.n.* (LE 260708). Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9354*. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Bunisiak River mouth, 17.vii.1984,

Zhurbenko 84224 (LE 207173). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 12.viii.1997, *Matveeva s.n.* (LE 260181). Cape Baranova, 15.vii.1996, *Zhurbenko 961005* (LE 260132); 20.vii.1996, *Zhurbenko 96681* (LE 233450) – TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95355* (LE 233198); 31.vii.1995, *Zhurbenko 95389* (LE 233394b). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 7.vii.1979, *Makarova s.n.* (LE); 8.vii.1979, *Makarova s.n.* (LE 207626). – Chegitun' River at its confluence with the Khesmymken River, 15.viii.1982, *Katenin s.n.* (LE 207621b). Ioni Lake, 7.vii.1977, *Makarova s.n.* (LE 207630). Iskaten' Ridge, 29.vi.1971, *Makarova s.n.* (LE 261736a). Niuniamuveem River, 6.viii.1985, *Katenin s.n.* (LE). Paliavaam settlement, 1980, *Yurtsev s.n.* (LE 233660). Sireniki settlement, 20.vii.1983, *Makarova s.n.* (LE 233283); 22.vii.1983, *Makarova s.n.* (LE 233374). Televeem River, 19.vii.1979, *Makarova s.n.* (LE 233286).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2002b, 2009a, 2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Zhdanov (2013).

***Merismatium nigritellum* (Nyl.) Vouaux**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (33). Highly-active. On thalli, occasionally apothecia, of *Biatora cuprea*, *B. subduplex*, *Brigantiaea fuscolutea*, *Bryonora castanea*, *Cladonia* sp., *Dibaeis baeomyces* (apothecia), *Fuscopannaria praetermissa*, *Gyalecta foveolaris*, *Icmadophila ericetorum*, *Lecanora luteovernalis*, *Lecidea berengeriana*, *L. epiphaea*, *Lepraria neglecta*, *Lopadium coralloideum*, *L. pezizoideum*, *Megaspora verrucosa*, *Micarea assimilata*, *Mycobilimbia carneoalbida*, *Peltigera* sp., *Polychidium muscicola*, *Psoroma hypnorum*, *Solorina bispora*, and *Sporodictyon terrestre*. Commensal or facultative saprobe.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97354c* (LE 233323c). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Ziegler Island, 25.vii.2019, *Konoreva 149* (LE F-350213). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 22.vii.2007, *Zhurbenko 0779* (LE 310179); 24.vii.2007, *Zhurbenko 0713* (LE 210317). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9362* (LE 309026). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 2.viii.1982, *Titov s.n.* (LE 233353); 2.viii.1983, *Zhurbenko 83224* (LE 233328). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96929* (LE 233347). Cape Antseva, 6.viii.1997, *Matveeva s.n.* (LE 233316); 27.viii.1998, *Matveeva s.n.* (LE 233297); 1.ix.1998, *Matveeva s.n.* (LE 233274). Cape Baranova, 13.vii.1996, *Zhurbenko 96936* (LE 233284); 15.vii.1996, *Zhurbenko 961004* (LE 260103). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96957* (LE 233884), *Zhurbenko 96943* (LE 233181). Ostantsovaia River, 12.vii.1996, *Zhurbenko 96925* (LE 233386). Studënaia River, 16.viii.1998, *Matveeva s.n.* (LE 260268). – TAYMYR PENINSULA. East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95371* (LE 233166). North of Levinson-Lessinga Lake, 6.viii.1995, *Zhurbenko 95372* (LE 233186); 25.viii.1995, *Zhurbenko 95477c* (LE 233863c), *Zhurbenko 95393* (LE 233334); 26.viii.1995, *Zhurbenko 95376* (LE 233175). South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95400c* (LE 233292c); 1.viii.1995, *Zhurbenko 95394* (LE 233383). North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 83106b* (LE 309296b). Tolstyĭ Nos settlement, 27.viii.1876, *Brenner s.n.* (UPS). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 18.vii.1998, *Zhurbenko 98416a* (LE 308912a; as *M.* cf. *nigritellum*). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 14.vii.1979, *Makarova s.n.* (LE 207629). Inchoun settlement, 2.viii.1975, *Makarova s.n.* (LE 233376). Ioni Lake, 3.vii.1977, *Makarova s.n.* (LE 261757). Koliuchinskaia Bay, 29.viii.1980, *Katenin & Zhurbenko s.n.* (LE 233358b). – WRANGEL ISLAND. Krasnyĭ Flag River, 27.vii.1997, *Kholod s.n.* (LE 233367). Neizvestnaia River at its headwaters, 15.vii.1987, *Kholod s.n.* (LE 232108).

REPORTS. – Chesnokov & Konoreva (2023), Karatygin et al. (1999), Triebel (1989), Zhurbenko (2002b, 2007b, 2008, 2009a, 2009b, 2020b), Zhurbenko & Pino-Bodas (2017).

***Merismatium* cf. *peregrinum* (Flot.) Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On '*Aspicilia*' sp. (thallus). Possibly a commensal.

VOUCHER. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9353* (LE 309028).

REPORT. – Zhurbenko (2002b).

***Merismatium thamnoliicola* Alstrup & E.S. Hansen**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On *Thamnolia vermicularis* var. *subuliformis* (thallus). Commensal or saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. Sredniĭ Island, 24.viii.1930, *Savicz s.n.* (LE 260430); 25.viii.1930, *Savicz s.n.* (LE 260450). – BOL'SHEVIK ISLAND. Akhmatova Bay, 18.vii.1996, *Zhurbenko 961027* (LE 260554). – TAYMYR PENINSULA. Bol'shaia Bootankaga River, 10.vii.1991, *Kuvaev s.n.* (LE 260473).

REPORT. – Zhurbenko (2012).

***Micarea inquinans* (Tul.) Coppins**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Dibaeis baeomyces* (thallus). Commensal or weak pathogen.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 21.vii.2007, *Zhurbenko 0780* (LE 310173).

REPORT. – Zhurbenko (2020b).

***Minutoexcipula tephromelae* V. Atienza, Etayo & Pérez-Ortega**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Tephromela atra* (thallus). Commensal or weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA**, Puoten settlement, 18.vii.1972, *Makarova s.n.* (LE 261582).

REPORT. – Zhurbenko (2010c).

***Muellerella atricola* (Linds.) Sacc. & D. Sacc.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (4). Low-active. On *Tephromela atra* (thallus). Commensal.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 22.vii.1998, *Cherkasova s.n.* (LE 261575, LE 261584b). Tas-Ary Island, 17.vii.1988, *Makarova s.n.* (LE 207617) – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 261629b).

REPORT. – Zhurbenko (2009b); see also *Muellerella lichenicola* in Erroneous and Doubtful Records.

***Muellerella erratica* (A. Massal.) Hafellner & V. John**

(≡ *Endococcus erraticus* (A. Massal.) Nyl.; = *Muellerella pygmaea* (Körb.) D. Hawksw. var. *athallina* (Müll. Arg.) Triebel)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (41). Highly-active. On apothecia and thalli of *Aspicilia* spp., *Blastenia ammiospila*, *Caloplaca* sp. growing on carbonate rocks, *Lecanora polytropa*, *Lecidea auriculata*, *L. umbonata*, saxicolous *Lecidea* sp., *Myriolecis dispersa*, *Protoblastenia rupestris*, *P. incrustans*, and *Rusavskia elegans*. Commensal or occasionally weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. McClintock Island, 30.vii.1930, *Savicz s.n.* (LE 261637). – NOVAYA ZEMLYA. Ivanova Bay, 31.viii.1995, *Vekhov s.n.* (LE 261597). – **NENETS AUTONOMOUS AREA.** Bol'shoĭ TSinkovyĭ Island, 1997, *Shevchenko s.n.* (LE 261638). – **KOMI REPUBLIC.** Elets River, 28.vi.1993, *Zhurbenko 93172* (LE 261647). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9349* (LE 309025), *Zhurbenko 9350* (LE 309022). – **KRASNOYARSK TERRITORY.** – PUTORANA PLATEAU. Kapchuk Lake, 18.vii.1983, *Zhurbenko 83232* (LE 261527); 13.viii.1983, *Zhurbenko 83196* (LE 207179). – SEVERNAYA ZEMLYA. OKTIABR'SKOĬ REVOLYUTSII ISLAND. Cape Vatutina, 23.vii.1979, *Khodachek s.n.* (LE 261779). – TAYMYR PENINSULA. East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95371* (LE 233166), *Zhurbenko 95540* (LE 261727), *Zhurbenko 95563* (LE 261564), *Zhurbenko 95327* (LE 232892). North of Levinson-Lessinga Lake, 25.vii.1995, Zhurbenko *95561* (LE 261745); 26.vii.1995, Zhurbenko *95560* (LE 261774), Zhurbenko *95562a* (LE 261574a); 6.viii.1995, *Zhurbenko 95326* (LE 233062); 20.viii.1995, *Zhurbenko 95527a* (LE 261578a); 22.viii.1995, *Zhurbenko 95567* (LE 261524); 24.viii.1995, *Zhurbenko 95566* (LE 261744); 30.viii.1995, *Zhurbenko 95564* (LE 261664). South of Levinson-Lessinga Lake, 31.vii.1995, *Zhurbenko 9540* (distributed in Microfungi Exsiccati (Triebel 2006)), *Zhurbenko 95532b* (LE 261598b), *Zhurbenko 95533* (LE 261788). Ragozinka River, 2.vii.1990, *Zhurbenko 90564* (LE 261657);

14.vii.1990, *Zhurbenko 90576b* (LE 261549b). Pravaia Uboĭnaia River, 6.viii.1990, *Zhurbenko 90565* (LE 261749). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98396* (LE 261738). Bulunkan-Khaiata Tract, 23.vii.1988, *Makarova s.n.* (LE 261529b). Stolb Island, 12.viii.1998, *Zhurbenko 98399* (LE 261754). Tiksi settlement, 13.viii.1982, *Perfil'eva s.n.* (LE 261507). Tit-Ary Island, 17.vii.1988, *Makarova s.n.* (LE 261504a). YUryung-Kysam Tract, 16.viii.1988, *Makarova s.n.* (LE 233372a). – NEW SIBERIAN ISLANDS. Kotel'nyĭ Island, Evsekiu-Bulgunniakh Upland on Bunge Land, 12.viii.1980, *Perfil'eva s.n.* (LE 261678). – **CHUKOTKA AUTONOMOUS AREA.** Ioni Lake, 3.vii.1977, *Makarova s.n.* (LE 261528). Lavrentiia settlement, 10.vii.1973, *Makarova s.n.* (LE 261687); 12.vii.1973, *Makarova s.n.* (LE 233252); 1.viii.1973, *Makarova s.n.* (LE 261755, LE 261714). Sireniki settlement, 20.vii.1983, *Makarova s.n.* (LE 261798b). Televeem River, 23.vii.1979, *Makarova s.n.* (LE 261654a). – WRANGEL ISLAND. Gusinaia River, *Shtrik s.n.*, 5.viii.1991 (LE 210458a).

REPORTS. – Zhurbenko (2002b, 2008, 2009a, 2009b), Zhurbenko & Hafellner (1999), Triebel (2006).

***Muellerella hospitans* Stizenb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On a crustose terricolous lichen (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94100a* (LE).

REPORT. – Zhurbenko & Santesson (1996).

***Muellerella lichenicola* (Sommerf.) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (26). Highly-active. On thalli, occasionally apothecia, of *Caloplaca nivalis*, *Caloplaca* sp., *Gyalolechia bracteata*, *G. xanthostigmoidea*, *Lecidea lapicida*, *Lecidella* sp. growing on driftwood, *Mycoblastus sanguinarius*, terricolous *Ochrolechia* sp., *Tephromela atra*, *Toninia squalida*, *Xanthomendoza borealis*, and *Rusavskia elegans* (here noted also on apothecia). Commensal or sometimes pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97337* (LE 232842). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 23.vii.1930, *Savicz s.n.* (LE 207318b). – **NENETS AUTONOMOUS AREA.** Bol'shoĭ TSinkovyĭ Island, 1997, *Shevchenko s.n.* (LE 261658a). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. South of Aian Lake, 27.viii.1984, *Zhurbenko 84220* (LE 207175); Bunisiak River mouth, 14.vii.1984, *Zhurbenko 84222* (LE 207176). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1995, *Zhurbenko 95545a* (LE 261558a). Krasnoe Lake, 15.viii.1995, *Zhurbenko 95541b* (LE 261777b). East of Levinson-Lessinga Lake, 20.viii.1994, *Zhurbenko 94342* (LE 207361), *Zhurbenko 94343* (LE); 9.viii.1995, *Zhurbenko 95334* (LE 232992). North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94138* (LE), *Zhurbenko 9494* (LE); 3.viii.1994, *Zhurbenko 94320* (LE); 25.viii.1994, *Zhurbenko 94440* (LE); 26.viii.1994, *Zhurbenko 94457* (LE); 29.viii.1994, *Zhurbenko 9410* (LE); 22.vii.1995, *Zhurbenko 95333* (LE 232802); 20.viii.1995, *Zhurbenko 95336* (LE 232832). South of Levinson-Lessinga lake, 1.viii.1995, *Zhurbenko 95338* (LE 232952). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95335* (LE 232942). – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 19.vii.1977, *Makarova s.n.* (LE 232852); 23.vii.1977, *Makarova s.n.* (LE 233227b). Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 207229a). Vesnovannaia River, 12.viii.1980, *Makarova s.n.* (LE 233378). – WRANGEL ISLAND. Gusinaia River, 15.viii.1991, *Shtrik s.n.* (LE 210307). Cape Ptichiĭ Bazar, 24.viii.1991, *Kholod s.n.* (LE 210476).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2008, 2009a, 2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Muellerella pygmaea* (Körb.) D. Hawksw. s. lat.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (49). Medium-active. On thalli, occasionally apothecia, of saxicolous *Buellia* sp., saxicolous *Caloplaca* spp., *Lecanora hagenii*, *L. polytropa*, saxicolous *Lecanora* spp., *Lecidea* aff. *tessellata*, saxicolous *Lecidea* spp., *Myriolecis dispersa*, saxicolous *Pertusaria* sp., and *Rusavskia elegans*. Commensal or sometimes weak pathogen. Note: The given characteristics are rather conventional because the catalogue also includes records of *Muellerella erratica*, *M. pygmaea* s. str., and *M. ventosicola*, included in the concept of *M. pygmaea* s. lat.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Aagaard Island, 31.vii.1930, *Savicz 10300* (LE 207327). Alger Island, 1.viii.1930, *Savicz s.n.* (LE 207322). Bell Island, 28.vii.1930, *Savicz s.n.* (LE 207321). Hooker Island, 23.vii.1930, *Savicz s.n.* (LE 207318a); 24.vii.1930, *Savicz s.n.* (LE 207324); 26.vii.1930, *Savicz s.n.* (LE 207316); 2.viii.1930, *Savicz 17b* (LE 207187), *Savicz 17c* (LE 207325), *Savicz 17d* (LE 207191). Northbrook Island, 28.vii.1930, *Savicz s.n.* (LE 207317, LE 207323, LE 207330). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. Srednīĭ Island, 24.viii.1930, *Savicz 68bis* (LE 207197); 25.viii.1930, *Savicz 78bis* (LE 207182); 26.viii.1930, *Savicz 79bis* (LE 207183, LE 207185, LE 207188, LE 207193, LE 207194, LE 207196, LE 207198, LE 207199, LE 207200, LE 207319). – TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94185* (LE 207062), *Zhurbenko 94198* (LE 207307), *Zhurbenko 94225* (LE 207305); 12.viii.1994, *Zhurbenko 94303* (LE 207308), *Zhurbenko 94305* (LE 207302). East of Levinson-Lessinga Lake, 20.viii.1994, *Zhurbenko 94344b* (LE 207303b), *Zhurbenko 94345* (LE 207311). North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 9497* (LE 207320), *Zhurbenko 94152* (LE 207195); 3.viii.1994, *Zhurbenko 94253* (LE 207301), *Zhurbenko 94319* (LE 207306), *Zhurbenko 94322* (LE 207312); 24.viii.1994, *Zhurbenko 94422* (LE 207315); 26.viii.1994, *Zhurbenko 94441b* (LE), *Zhurbenko 94447* (LE 207329), *Zhurbenko 94459* (LE 207304), *Zhurbenko 94460* (LE 207314), *Zhurbenko 94461* (LE 207326). – **REPUBLIC OF SAKHA (YAKUTIA).** NEW SIBERIAN ISLANDS. Bennetta Island., 15.viii.1989, *Zhurbenko 8963* (LE 207189). Zhokhova Island, 27.viii.1989, *Samarskii s.n.* (LE 207310); 1989, *Samarskii s.n.* (LE 207184, LE 207192, LE 207309, LE 207313). – **CHUKOTKA AUTONOMOUS AREA.** Bol'shoĭ Peledon River, 1.viii.1982, *M. P. Andreev s.n.* (M).

REPORTS. – Samarskii et al. (1997), Triebel (1989), Zhurbenko & Santesson (1996).

***Muellerella pygmaea* (Körb.) D. Hawksw. s. str.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (11). Medium-active. On apothecia and thalli of *Lecanora* sp., *Lecidea lapicida*, saxicolous *Lecidea* sp., *Rhizocarpon alpicola*, *R. geographicum*, *Rhizocarpon* sp., and *Rusavskia elegans*. Commensal or sometimes weak pathogen.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Sob' River, 11.vii.1986, *Zhurbenko 86125* (LE 261724); 13.vii.1986, *Zhurbenko 86116* (LE 261569a); 17.vii.1986, *Zhurbenko 86185* (LE 261739). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 3.viii.1983, *Zhurbenko 83191* (LE 207178). – SEVERNAYA ZEMLYA. OKTIABR'SKOĬ REVOLYUTSII ISLAND, Skazochnaia Bay, 5.viii.1985, *Gavrilo s.n.* (LE 261699). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 24.vii.1995, *Zhurbenko 95528* (LE 261508); 24.viii.1995, *Zhurbenko 95543* (LE 261747). Ragozinka River, 2.vii.1990, *Zhurbenko 90880* (LE 261797). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 207229b. Mount Nauneson, 7.viii.1970, *Makarova s.n.* (LE 261570). Puoten settlement, 18.vii.1972, *Makarova s.n.* (LE 261579).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2009b), Zhurbenko & Hafellner (1999).

***Muellerella ventosicola* (Mudd) D. Hawksw.**

(≡ *Muellerella pygmaea* var. *ventosicola* (Mudd) Triebel)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (17). Medium-active. On thalli, occasionally apothecia, of *Miriquidica garovaglii*, *Ophioparma lapponica*, *O. ventosa*, *Rhizocarpon alpicola*, *R. eupetraeum*, and *R. geographicum*. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 26.viii.1997, *Zhurbenko 97382* (LE 261619); 2.ix.1997, *Zhurbenko 97338* (LE 233032). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93147* (LE 232697). Sob' River, 23.vi.1993, *Zhurbenko 9373* (LE). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96942* (LE 233391). – **REPUBLIC OF SAKHA (YAKUTIA).** Bulunkan-Khaiata Tract, 23.vii.1988, *Makarova s.n.* (LE 261580). Tiksi settlement, 10.vii.1988, *Makarova s.n.* (LE 232822); 19.vii.1998, *Zhurbenko 98395* (LE 261559). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 9.viii.1979, *Makarova s.n.* (LE 261599); 17.viii.1979, *Makarova s.n.* (LE 233012). Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 261659). Ioni Lake, 5.vii.1977, *Makarova s.n.* (LE 261639, LE 261659). Lavrentiia settlement, 16.vii.1972, *Makarova s.n.* (LE 261530); 28.vii.1973, *Makarova s.n.* (LE 261649). Puoten settlement, 19.vii.1972, *Makarova s.n.* (LE 261689). – WRANGEL ISLAND. Gusinaia River, viii.1991, *Shtrik s.n.* (LE 261560).

REPORTS. – Zhurbenko (2002b, 2008, 2009a, 2009b).

***Nanostictis peltigerae* M.S. Christ.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (3). Low-active. On thalli (mostly on their underside, including rhizines) of *Peltigera aphthosa* and *P. leucophlebia*. Commensal or facultative saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96956* (LE 233834). – TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95440* (LE 233918). Kotuĭ River, 27.viii.1997, *Nissen s.n.* (C ?). – **REPUBLIC OF SAKHA (YAKUTIA).** Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98324* (LE 233888).

REPORTS. – Alstrup (2004), Zhurbenko (2009b).

***Neoechinodiscus kozhevnikovii* (Zhurb.) Molinari & R. Sierra**

(≡ *Echinodiscus kozhevnikovii* Zhurb.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Cetraria islandica* (thallus). Pathogen.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 25.vii.2007, *Zhurbenko 0773* (LE 233410).

REPORT. – Zhurbenko (2009a).

***Neolamya ahtii* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli of *Cladonia gracilis* and *C. stellaris*. Pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 24.vii.2007, *Zhurbenko 0739a* (LE 308554, holotype). – **CHUKOTKA AUTONOMOUS AREA.** Ottaĭpytgyn River, 2.viii.1952, *Baikova s.n.* (LE 308800).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Neolamya peltigerae* (Mont.) Theiss. & Syd.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (3). Low-active. On *Peltigera didactyla* (thallus). Commensal or sometimes weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 3.viii.1983, *Zhurbenko 83176* (LE 207332). – **CHUKOTKA AUTONOMOUS AREA.** Ėnmyvaam River, 2.vii.1980, *Makarova s.n.* (LE 233968). Paliavaam settlement, 1980, *Yurtsev s.n.* (LE 233558).

REPORTS. – Zhurbenko (2009b), Zhurbenko & Hafellner (1999).

***Nesolechia cetrariicola* (Linds.) Arnold**

CHARACTERIZATION. – Quite visible to the naked eye. Very rare (1). Low-active. On *Cetraria rassadinae* (thallus). Commensal, sometimes gall-former.

VOUCHER. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83158* (LE 207333).

REPORT. – Zhurbenko & Hafellner (1999).

***Nesolechia oxyspora* (Tul.) A. Massal. var. *fusca* (Triebel & Rambold) Diederich**

(≡ *Phacopsis fusca* (Triebel & Rambold) Diederich)

CHARACTERIZATION. – Quite visible to the naked eye. Very rare (2). Low-active. On *Xanthoparmelia stenophylla* (thallus). Commensal, gall-former.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93217a* (LE 232105). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 17.vii.1998, *Zhurbenko 98294* (LE 233359).

REPORTS. – Zhurbenko (2008, 2009a).

Nesolechia oxyspora* (Tul.) A. Massal. var. *oxyspora

(≡ *Phacopsis oxyspora* (Tul.) Triebel & Rambold var. *oxyspora*)

CHARACTERIZATION. – Quite visible to the naked eye. Infrequent (14). Medium-active. On thalli of *Melanohalea infumata*, *M. septentrionalis*, *Parmelia omphalodes*, *P. saxatilis*, and *P. sulcata*. Commensal, gall-former.

VOUCHERS. – **MURMANSK REGION.** 15 km N of Tumannyĭ settlement, 19.viii.1997, *Zhurbenko 97343b* (LE 233260b). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9340* (LE); 27.vi.1993, *Zhurbenko 93123* (LE 232185), *Zhurbenko 93119b* (LE 232158b). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. North of Aian Lake, 30.vii.1984, *Zhurbenko 84200* (LE 207342); 2.viii.1984, *Zhurbenko 84199* (LE 207338), *Zhurbenko 84221* (LE 207336). Bunisiak River mouth, 17.vii.1984, *Zhurbenko 84210* (LE 207339), *Zhurbenko 84225* (LE 207341). Kapchuk Lake, 1.viii.1983, *Zhurbenko 83223* (LE 233189); viii.1983, *Zhurbenko 8342* (LE 207340). – **CHUKOTKA AUTONOMOUS AREA.** IAnrakynnot settlement, 22.viii.1978, *Sekretareva s.n.* (LE 233148). Lavrentiia settlement, 28.vii.1973, *Makarova s.n.* (LE 233380); 29.vii.1973, *Makarova s.n.* (LE 233340).

REPORTS. – Zhurbenko (2002b, 2008, 2009a), Zhurbenko & Hafellner (1999).

***Niesslia cladoniicola* D. Hawksw. & W. Gams**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Low-active. On thalli of *Cladonia amaurocraea*, *C. gracilis*, *C. pyxidata*, *C. stellaris*, and *C. uncialis*. Commensal or saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY**. SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 10.viii.2000, *Matveeva s.n.* (LE 308477). – TAYMYR PENINSULA. North-west of Piasino Lake, 24.vii.1999, *Zanokha s.n.* (LE 261603). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 9.viii.1979, *Makarova s.n.* (LE 308823). Baranikha settlement, 21.vi.1971, *Makarova s.n.* (LE 308830). Innepinkul'veem River, 10.viii.1951, *Ababkov s.n.* (LE 308801).

REPORTS. – Zhurbenko & Alstrup (2004), Zhurbenko & Pino-Bodas (2017).

***Niesslia keissleri* Zhurb.**

(= *Echinothecium cladoniae* Keissl., nom. nud.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (15). Medium-active. On thalli of *Cladonia amaurocraea*, *C. coccifera*, *C. ecmocyna*, *C. furcata*, *C. gracilis*, *C. metacorallifera*, and *C. uncialis*. Commensal or sometimes weak pathogen or saprobe.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Khabuĭkato Lake, 5.vii.1999, *O. V. Lavrinenko s.n.* (LE 308933). Khar'iaga oilfield, 18.vii.2007, *Zhurbenko 0744* (LE 308505). Ortina River, 28.vi.1999, *O. V. Lavrinenko s.n.* (LE 308928). – **YAMAL-NENETS AUTONOMOUS AREA.** Kharasavėĭ settlement, 20.viii.2008, *Walker s.n.* (LE 308569). Mount Rai-Iz, 4.ix.2001, *Kholod s.n.* (LE 308574a). Saletaiakha River, 12.viii.1990, *Rebristaia s.n.* (LE 308813). – **KRASNOYARSK TERRITORY.** Leskino settlement, 16.viii.1972, *YUnak & Prokop'eva s.n.* (LE 308838). – PUTORANA PLATEAU. Kapchuk Lake, vii.1983, *Zhurbenko s.n.* (LE). – **CHUKOTKA AUTONOMOUS AREA.** Baran'e Lake, 24.vii.1980, *Makarova s.n.* (LE 308788). Ėgvekinot settlement, 22.vii.1951, *Berezina s.n.* (LE 308794). Gil'mymlineĭveem River, 26.vii.1977, *Makarova s.n.* (LE 308777). Ioni Lake, 7.vii.1977, *Makarova s.n.* (LE 308831). Iskaten' Ridge, 6.viii.1971, *Makarova s.n.* (LE 308807). Mount Pynei, 3.vi.1951, *Shmorunova s.n.* (LE 308810a). Utesiki settlement, 21.viii.1948, *Avramchik s.n.* (LE 308804, LE 308773b).

REPORTS. – Zhurbenko (2000), Zhurbenko & Pino-Bodas (2017).

***Niesslia peltigericola* (D. Hawksw.) Etayo**

(≡ *Wentiomyces peltigericola* D. Hawksw.; ≡ *Raciborskiomyces peltigericola* (D. Hawksw.) M.E. Barr)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (10). Low-active. On thalli, occasionally cephalodia, of *Peltigera aphthosa*, *P. leucophlebia*, *P. malacea*, *P. rufescens*, and *Stereocaulon rivulorum* (rare). Commensal or facultative saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko 90903b* (LE 233719b). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 18.vii.1996, *Zhurbenko 96948b* (LE 233864b). Cape Baranova, 20.vii.1996, *Zhurbenko 96950* (LE 233984), *Zhurbenko 96951* (LE

233784). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Parizhskoĭ Kommuny Peninsula, 29.vii.1985, *Gavrilo s.n.* (LE 233791). – TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95439b* (LE 233928b). Krasnaia River, 10.viii.1994, *Zhurbenko 94179a* (GZU, LE 207599a, UPS). North of Levinson-Lessinga Lake, 22.vii.1995, *Zhurbenko 95457* (LE 233805). Piasina River mouth, 7.viii.1993, *Kuvaev 2197* (LE 207600). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 18.vii.1998, *Zhurbenko 98342* (LE 233765).

REPORTS. – Zhurbenko (2009b, 2010a), Zhurbenko & Santesson (1996).

***Nigropuncta rugulosa* D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Bellemerea* sp. (thallus). Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Alexandra Land Island, 11.vii.2019, *Chesnokov 10* (LE F-350217). – **KOMI REPUBLIC.** Paga River, 26.vi.2007, *Hermansson 15610a* (UPS F-165224).

REPORTS. – Chesnokov & Konoreva (2023), The Museum of evolution herbarium, Uppsala University (2024).

***Opegrapha geographicola* (Arnold) Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Rhizocarpon geographicum* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Lavrentiia settlement, 25.vii.1973, *Makarova s.n.* (LE 261759).

REPORT. – Zhurbenko (2009b).

***Opegrapha placidiicola* (Zhurb.) Nav.-Ros. & Romero**

(≡ *Opegrapha pulvinata* Rehm var. *placidiicola* Zhurb.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Placidium squamulosum* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Loren River, 15.viii.1972, *Makarova s.n.* (LE 261593, holotype).

REPORT. – Zhurbenko (2009b).

***Opegrapha stereocaulicola* Alstrup & D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (29). Medium-active. On thallis (pseudopodetia, occasionally phyllocladia) of *Stereocaulon alpinum*, *S. arcticum*, *S. botryosum*, *S. capitellatum*, *S. depressum*, *S. groenlandicum*, *S. paschale*, *S. rivulorum*, and *S. subcoralloides*. Commensal or sometimes weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Ortina River, 29.vi.1999, *O. V. Lavrinenko s.n.* (LE 233494). – **YAMAL-NENETS AUTONOMOUS AREA.** Khasseinto-Se River, 29.vi.1927, *Gorodkov s.n.* (LE 233435). – **KRASNOYARSK TERRITORY**. Dikson Island, 7.vii.1990, *Zhurbenko 90827* (LE 233790), *Zhurbenko 901147* (LE 233455). – TAYMYR PENINSULA. Krasnoe Lake, 15.viii.1995, *Zhurbenko 95430* (LE 233535); 16.viii.1995, *Zhurbenko 9518* (LE 233485). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 9520* (M). South of Levinson-Lessinga Lake, 31.vii.1995, *Zhurbenko 95428* (LE 233515); 28.viii.1995, *Zhurbenko 95431* (LE 233495). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90366* (LE 207699), *Zhurbenko 901149* (LE 233940). Ragozinka River, 14.vii.1990, *Zhurbenko 90814* (LE 233405), *Zhurbenko 90830* (LE 233800). Uboĭnaia River mouth, 31.vii.1990, *Zhurbenko 90898* (LE 233890); 1.viii.1990, *Zhurbenko 90904* (LE 233880); 9.viii.1990, *Zhurbenko 90365* (LE 207684), *Zhurbenko 90909b* (LE 233900b); 11.viii.1990, *Zhurbenko 90899* (LE 233850). – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98239* (LE 260063). Samoĭlovskiĭ Island, 15.viii.1998, *Zhurbenko 988* (LE 233536). Stolb Island, 12.viii.1998, *Zhurbenko 9810* (LE 233465). Tiksi settlement, 17.vii.1998, *Zhurbenko 9841* (LE 233415), *Zhurbenko 9842* (LE 233506); 18.vii.1998, *Zhurbenko 9850* (LE); 24.viii.1998, *Zhurbenko 9814* (H, LE 233475). Yrbalakh-Aryta Island, 26.vii.1997, *Cherkasova s.n.* (LE 233445). YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 9813* (LE 233616). – **CHUKOTKA AUTONOMOUS AREA.** Iskaten' Ridge, 22.viii.1971, *Kostina s.n.* (LE 233425). Kaneliveem River, 21.vii.1977, *Petrovskiĭ s.n.* (LE 233456).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2010a).

***Pezizella epithallina* (W. Phillips & Plowr.) Sacc.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Peltigera didactyla* (thallus). Commensal or facultative saprobe.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94182* (LE 207343).

REPORT. – Zhurbenko & Santesson (1996).

***Phacopsis* cf. *cephalodioides* (Nyl.) Triebel & Rambold**

CHARACTERIZATION. – Sometimes visible to the naked eye. Very rare (1). Low-active. On *Cetrariella commixta* (thallus). Commensal, gall-former.

VOUCHER. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. Ragozinka River, 12.vii.1990, *Zhurbenko 90401* (LE 260102).

REPORT. – Zhurbenko (2009b).

***Phacopsis vulpicidae* Zhurb. & Diederich**

CHARACTERIZATION. – Sometimes visible to the naked eye. Very rare (1). Low-active. On *Vulpicida juniperina* (thallus). Commensal, gall-former.

VOUCHER. – **REPUBLIC OF SAKHA (YAKUTIA).** YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko* 9859 (GZU, LE 309880).

REPORT. – Zhurbenko et al. (2019).

***Phaeoseptoria peltigerae* Punith. & Spooner**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Peltigera rufescens* (thallus). Pathogen.

VOUCHER. – **REPUBLIC OF SAKHA (YAKUTIA).** Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98366* (LE 260149).

REPORT. – Zhurbenko (2009b).

***Phaeospora arctica* Horakova & Alstrup**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Allocetraria madreporiformis* (thallus). Commensal or possibly facultative saprobe.

VOUCHER. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. Srednii Island, 25.viii.1930, *Savicz 2049* (C, GZU, LE 207345, M, UPS).

REPORT. – Zhurbenko & Santesson (1996).

***Phaeospora peltigericola* D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (7). Low-active. On thallus, occasionally cephalodia, of *Peltigera leucophlebia* and *Peltigera* sp. Weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Bunisiak River mouth, 11.vii.1984, *Zhurbenko 84192* (LE 207348). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96975* (LE 260140); 18.vii.1996, *Zhurbenko 96973* (LE 260150). – TAYMYR PENINSULA. Krasnoe Lake, 17.viii.1995, *Zhurbenko 95494* (LE 260120). North of Levinson-Lessinga Lake, 22.vii.1995, *Zhurbenko 95486* (LE 260220), *Zhurbenko 95490* (LE 260170). – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 98367* (LE 260269).

REPORTS. – Zhurbenko (2009b), Zhurbenko & Hafellner (1999).

***Phaeospora rimosicola* (Leight. ex Mudd) Hepp**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On *Rhizocarpon* spp. (thallus). Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Matochkin Shar Strait, 1921, *Lynge s.n.* (O). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 9.viii.1975, *Makarova s.n.* (LE 207125).

REPORTS. – Karatygin et al. (1999), Keissler (1928).

***Plectocarpon linitae* (R. Sant.) Wedin & Hafellner**

(≡ *Arthonia linitae* R. Sant.)

CHARACTERIZATION. – Quite visible to the naked eye. Rare (7). Medium-active. On *Lobaria linita* (thallus). Commensal or weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Bol'shaia Talata River, 9.ix.2008, *I. A. Lavrinenko s.n.* (LE 233027). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9336* (LE 261653). Sob' River, 23.vi.1993, *Zhurbenko 9377* (LE 261663). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94184* (LE 206920, UPS). Piasina River mouth, vii.1993, *Kuvaev s.n.* (LE 206921). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 24.viii.1998, *Zhurbenko 98276* (LE 233095). – **CHUKOTKA AUTONOMOUS AREA.** Uelen settlement, 8.viii.1975, *Makarova s.n.* (LE 233390).

REPORTS. – Zhurbenko (2002b, 2009a), Zhurbenko & Santesson (1996).

***Polycoccum crassum* Vězda**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli, including soralia, of *Peltigera extenuata* and *Peltigera* sp. Commensal or weak pathogen.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 24.viii.1998, *Zhurbenko 98350* (LE 233944). – **CHUKOTKA AUTONOMOUS AREA.** Penkigneĭ Bay coast at the mouth of the Pestsovaia River, 2.viii.1978, *Katenin s.n.* (LE 233748).

REPORT. – Zhurbenko (2009b).

***Polycoccum pulvinatum* (Eitner) R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (3). Low-active. On *Physcia caesia* (thallus). Commensal, gall-former.

VOUCHERS. – **KOMI REPUBLIC.** Elets River, 29.vi.1993, *Zhurbenko 93205* (LE 260172). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93149a* (LE 260202a). – **CHUKOTKA AUTONOMOUS AREA.** Ėnmyvaam River, 30.vi.1980, *Makarova s.n.* (LE 233659a).

REPORT. – Zhurbenko (2009b).

***Polycoccum trypethelioides* (Th. Fr.) R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (38). Medium-active. On thalli (pseudopodetia, occasionally phyllocladia) of *Stereocaulon alpinum*, *S. condensatum*, *S. depressum*, *S. glareosum*, *S. groenlandicum*, *S. rivulorum*, *S. saxatile*, and *S. symphycheilum*. Commensal, gall-former.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9741* (LE 207387). – **NENETS AUTONOMOUS AREA.** Ortina River, 29.vi.1999, *O. V. Lavrinenko s.n.* (LE 233484a). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 23.viii.2001, *Kholod s.n.* (LE 233710a). Sob' River, 8.vii.1986, *Zhurbenko 8693* (LE 207702); 13.vii.1986, *Zhurbenko 86100*; 25.vii.1986, *Zhurbenko 86101*. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. North of Aian Lake, 8.viii.1984, *Zhurbenko 84251* (LE 207374). South of Aian Lake, 11.ix.1984, *Zhurbenko 84243a* (LE 207373a); 15.ix.1984, *Zhurbenko 84191* (LE 207378). Kapchuk Lake, 21.vii.1985, *Zhurbenko 8581* (LE 207380). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 9697* (LE 207379). Cape Baranova, 11.vii.1996, *Zhurbenko 9666* (LE 207382); 12.vii.1996, *Zhurbenko 9674* (LE 207385). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Peschanaia River, 20.vii.1985, *Gavrilo s.n.* (LE 233654). – TAYMYR PENINSULA. East of Levinson-Lessinga Lake, 19.viii.1994, *Zhurbenko 94338* (LE 207377). North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 9534*; 10.viii.1995, *Zhurbenko 9515* (LE 233492); 20.viii.1995, *Zhurbenko 9527* (M), *Zhurbenko 95432* (LE 233644). South of Levinson-Lessinga Lake, 19.vii.1995, *Zhurbenko 9534* (LE); 31.vii.1995, *Zhurbenko 95429* (LE 233505); 10.viii.1995, *Zhurbenko 9515* (LE 233492); 20.viii.1995, *Zhurbenko 9527* (M), *Zhurbenko 95432* (LE 233644). Oboĭnoe settlement, 3.viii.1996, *Kirtsideli s.n.* (LE 207642). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 901148* (LE 233960). Uboĭnaia River mouth, 31.vii.1990, *Zhurbenko 90891* (LE 233770). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 24.viii.1998, *Zhurbenko 9824* (LE), *Zhurbenko 9825* (LE 233514), *Zhurbenko 9826* (LE 233534). YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 9823* (LE 233604). – NEW SIBERIAN ISLANDS. Bennetta Island, 18.vii.1989, *Zhurbenko 8975* (LE 207683); 4.viii.1989, *Zhurbenko 8983b* (LE 207678b); 9.viii.1989,

Zhurbenko 8989 (LE), *Zhurbenko 8993* (LE 233502). – **CHUKOTKA AUTONOMOUS AREA.** Ioni Lake, 26.vii.1977, *Makarova s.n.* (LE 207383). Kytep-Guiten'ryveem River, 18.viii.1977, *Petrovskiĭ s.n.* (LE 233482). – WRANGEL ISLAND. Ushakovskoe settlement, 31.viii.1938, *Gorodkov s.n.* (LE 233414).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2000, 2001, 2002b, 2010a), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Polycoccum ventosicola* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Ophioparma lapponica* (apothecia, thallus). Pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Vesnovannaia River, 15.viii.1980, *Makarova s.n.* (LE 232912).

REPORT. – Zhurbenko (2009a).

***Polycoccum vermicularium* (Linds.) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (18). Medium-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* and *T. vermicularis* var. *vermicularis*. Pathogen, gall-former.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 97391* (LE 260414). – **NENETS AUTONOMOUS AREA.** Bol'shoĭ TSinkovyĭ Island, 1997, *Shevchenko s.n.* (LE 232924). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94510* (LE 232803), *Zhurbenko 94512* (LE 260563). Krasnoe Lake, 16.viii.1995, *Zhurbenko 95570* (LE 260593). North of Levinson-Lessinga Lake, 6.viii.1995, *Zhurbenko 95311* (LE 233054); 20.viii.1995, *Zhurbenko 95576* (LE 260424). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90751* (LE 260363). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98283* (LE 232914). Tiksi settlement, 18.vii.1998, *Zhurbenko 98284* (LE 232833), *Zhurbenko 98404a* (LE 260344a); 24.viii.1998, *Zhurbenko 98409* (LE 260348). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 1971, *Galanin s.n.* (LE 260553); 22.vi.1971, *Makarova s.n.* (LE 260319). Chaplinskie hot springs, 7.viii.1957, *Gavriliuk & Gagarin s.n.* (LE 232843). Inchoun settlement, 30.vii.1975, *Makarova s.n.* (LE 232874). – WRANGEL ISLAND. Naskhok River, 1998, *Kholod s.n.* (LE 260580). Neizvestnaia River in its middle reaches, 1986, *Dobrysh* (LE 260397).

REPORT. – Zhurbenko (2012).

***Polydesmia lichenis* Huhtinen & R. Sant.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Peltigera leucophlebia* (thallus). Commensal or facultative saprobe.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95441* (LE 233908).

REPORT. – Zhurbenko (2009b).

***Pronectria erythrinella* (Nyl.) Lowen**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (3). Low-active. On thalli, including soralia, of *Peltigera extenuata* and *P. leucophlebia*. Commensal.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Severnaia River, 14.viii.1996, *O. V. Lavrinenko s.n.* (LE 233967). – **REPUBLIC OF SAKHA (YAKUTIA).** Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98331* (LE 233847); 8.viii.1998, *Zhurbenko 98330* (LE 233877).

REPORT. – Zhurbenko (2009b).

***Pronectria loweniae* Flakus, Etayo, Rodr. Flakus & Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (7). Low-active. On apothecium discs, occasionally adjacent parts of thallus, of *Solorina bispora* var. *bispora* and *S. bispora* var. *subspongiosa*. Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND, Hooker Island, 2.viii.1930, *Savicz 9d* (LE 207391). – **KRASNOYARSK TERRITORY.** Vize Island, 14.viii.1930, *Savicz 1607* (LE 207390). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 6.viii.1995, *Zhurbenko 95474* (LE 233942); 20.viii.1995, *Zhurbenko 95501b* (LE 260299b); 22.viii.1995, *Zhurbenko 95500* (LE 260260). –

REPUBLIC OF SAKHA (YAKUTIA). Cape Krest-Tumsa region, 4.viii.1998, *Zhurbenko 98368* (LE 260100). Samoĭlovskiĭ Island, 27.vii.1998, *Zhurbenko 98371* (LE 260080).

REPORT. – Senanayake et al. (2023); see also *Pronectria robergei* and *P. solorinae* in Erroneous and Doubtful Records.

***Pronectria robergei* (Mont. & Desm.) Lowen**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thallus of *Peltigera aphthosa*. Commensal or weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 22.vii.2007, *Zhurbenko 0728* (LE 210346); 25.vii.2007, *Zhurbenko 0727* (LE 210498).

REPORT. – Zhurbenko (2008).

***Pronectria tenuispora* (D. Hawksw.) Lowen**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (4). Low-active. On thalli of *Peltigera* '*occidentalis*'and *P. polydactylon*. Weak pathogen.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98332* (LE 233857). Samoĭlovskiĭ Island, 10.viii.1998, *Zhurbenko 98326* (LE 233947); 15.viii.1998, *Zhurbenko 98327* (LE 233767). Tit-Ary Island, 20.viii.1998, *Zhurbenko 98107* (LE 232770; distributed in Microfungi Exsiccati (Triebel 2003)).

REPORTS. – Triebel (2003), Zhurbenko (2009b).

***Pronectria walkerorum* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (6). Low-active. On thalli of *Ochrolechia frigida* and terricolous *Ochrolechia* sp. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96870* (LE 232665). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98244* (LE 232175). Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98242* (LE 232199). Cape Krest-Tumsa, *Zhurbenko 98243* (LE 232191). Stolb Island, 12.viii.1998, *Zhurbenko 98316* (LE 233629). – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Neizvestnaia River in its middle reaches, 15.viii.1995, *Kholod s.n.* (LE 232645).

REPORTS. – Zhurbenko (2009b, 2009c).

***Protothelenella santessonii* H. Mayrhofer**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (14). Medium-active. On thalli of *Cladonia coccifera*, *C. pocillum*, *C. pyxidata*, *C. stricta*, and *C. stygia*. Weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Ledianaia Gavan' Bay, 1.ix.1995, *Kuliev s.n.* (LE). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83164* (LE 207392). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 15.vii.1996, *Zhurbenko 96834* (LE 308988). Cape Antseva, 7.viii.1997, *Matveeva s.n.* (LE 308881). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 10.viii.1995, *Zhurbenko 95597* (LE 308908); 26.viii.1995, *Zhurbenko 95600b* (LE 308920b). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95214* (LE 308989). Uboĭnaia River mouth, 15.viii.1990, *Zhurbenko 901085a* (LE 308571a). – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98234* (LE 308984). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98227* (LE 308986). Stolb Island, 12.viii.1998, *Zhurbenko 98236* (LE 308987). – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 19.vii.1977, *Makarova s.n.* (LE 308983). – WRANGEL ISLAND. Gusinaia River, 18.vii.1991, *Kholod s.n.* (LE 308985); 30.vii.1996, *Kholod s.n.* (LE 308982).

REPORTS. – Zhurbenko & Alstrup (2004), Zhurbenko & Hafellner (1999), Zhurbenko & Pino-Bodas (2017).

***Pseudopyrenidium tartaricola* (Linds.) Nav.–Ros., Zhurb. & Cl. Roux**

(≡ *Weddellomyces tartaricola* (Linds.) Alstrup & D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (24). Medium-active. On thalli of *Ochrolechia frigida* (including f. *lapuënsis* and *O. inaequatula*) and terricolous *Ochrolechia* spp. Commensal, gall-former.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 21.viii.1997, *Zhurbenko 97329* (LE 232989), *Zhurbenko 97331* (LE 232999). Olenka River mouth, 5.ix.1997, *Zhurbenko 97330* (LE 233009). 15 km N of Tumannyĭ settlement, 19.viii.1997, *Zhurbenko 97332* (LE 233019). Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9744* (LE 207593). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 24.vii.1930, *Savicz 438* (LE 207595); 2.viii.1930, *Savicz 7* (LE 207594, LE 207596). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 21.vii.2007, *Zhurbenko 0724* (LE 232621). – **YAMAL-NENETS AUTONOMOUS AREA.** Baĭdaratskaĭa Bay coast E of Ngoiuiakha River mouth, 27.vii.2007, *Zhdanov s.n.* (LE 260718). Bovanenkovo settlement, 27.viii.2007, *Walker s.n.* (LE 232797). Saletaiakha River, 12.viii.1990, *Khitun s.n.* (LE 232868). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 12.vii.1996, *Zhurbenko 96890* (LE 233029); 13.vii.1996, *Zhurbenko 96850* (LE 232761). Studënaia River, 16.viii.1998, *Matveeva s.n.* (LE 232583). – TAYMYR PENINSULA. Bol'shaia Bootankaga River, 14.vii.1991, *Kuvaev s.n.* (LE 232169a). North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95276* (LE 232818); 10.viii.1995, *Zhurbenko 95275* (LE 232848). Ragozinka River, 12.vii.1990, *Zhurbenko 90614* (LE 233099). – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98270* (LE 232828). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98262* (LE 232808). – NEW SIBERIAN ISLANDS. Kotel'nyĭ Island, Kotel'nyĭ Island settlement, 15.vii.1947, *Gorodkov s.n.* (LE 233059). – **CHUKOTKA AUTONOMOUS AREA.** Kymyneĭveem River, 13.vii.1989, *Katenin s.n.* (LE 233049). Puoten settlement, 18.vii.1972, *Makarova s.n.* (LE 232838). – WRANGEL ISLAND. Gnilaia River, 29.viii.1998, *Kholod s.n.* (LE 232125).

REPORTS. – Navarro-Rosinés et al. (2010), Zhurbenko (2001), Zhurbenko & Santesson (1996), Zhurbenko & Zhdanov (2013).

***Pyrenidium actinellum* Nyl. s. lat.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (23). Medium-active. On thalli of *Baeomyces rufus*, *Peltigera venosa*, *Solorina bispora* var. *bispora*, and *S. bispora* var. *subspongiosa*. Commensal or sometimes weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 24.vii.1930, *Savicz s.n.* (LE 207075); 2.viii.1930, *Savicz s.n.* (LE 207066, LE 207067, UPS). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 21.vii.2007, *Zhurbenko 0778d* (LE 310178). – **KRASNOYARSK TERRITORY.** Vize Island, 14.viii.1930, *Savicz s.n.* (LE 207071, LE 207069). – SEVERNAYA ZEMLYA. Srednii Island, 24.viii.1930, *Savicz s.n.* (LE 207072); 18.vii.1979, *Khodachek s.n.* (LE 233853). – BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96964* (LE 233913). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96965* (LE 233723). – TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94164* (LE 207393), *Zhurbenko 94165* (LE 207394), *Zhurbenko 94224* (LE 207073). East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95470* (LE 233813). North of Levinson-Lessinga Lake, 25.viii.1994, *Zhurbenko 94453a* (LE 207562a), *Zhurbenko 94454a* (LE 207070a); 24.vii.1995, *Zhurbenko 95468* (LE 233833); 22.viii.1995, *Zhurbenko 95471* (LE 233923). South of Levinson-Lessinga Lake, 30.vii.1995, *Zhurbenko 95467* (LE 233933); 1.viii.1995, *Zhurbenko 95469* (LE 233883). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 7.vii.1979, *Makarova s.n.* (LE 233154); 8.vii.1979, *Makarova s.n.* (LE 233818). Televeem River, 19.vii.1979, *Makarova s.n.* (LE 232742).

REPORTS. – Czernyadjeva et al. (2021), Zhurbenko (2008, 2009a, 2009b), Zhurbenko & Santesson (1996).

***Raesaenenia huuskonenii* (Räsänen) D. Hawksw., C. Boluda & H. Lindgren**

(≡ *Phacopsis huuskonenii* Räsänen)

CHARACTERIZATION. – Sometimes visible to the naked eye. Very rare (1). Low-active. On *Bryoria nitidula* (thallus). Commensal, gall-former.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Televeem River, 18.vii.1979, *Makarova s.n.* (LE 233275).

REPORT. – Zhurbenko (2009a).

***Reconditella physconiarum* Hafellner & Matzer**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Physconia muscigena* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 19.vii.1977, *Makarova s.n.* (LE 233448).

REPORT. – Zhurbenko (2009b).

***Rhagadostoma brevisporum* (Nav.-Ros. & Hladun) Nav.-Ros.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Solorina saccata* (thallus). Weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96976a* (LE 233891a).

REPORT. – Zhurbenko (2009b).

***Rhagadostoma lichenicola* (De Not) Keissl.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Infrequent (11). Medium-active. On thalli, occasionally apothecia, of *Solorina bispora*, *S. crocea* (mostly), and *S. saccata*. Weak pathogen or possibly facultative saprobe.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9732* (LE 207393). – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 24.vii.1999, *O. V. Lavrinenko s.n.* (LE 233017). – **YAMAL-NENETS AUTONOMOUS AREA.** Belyĭ Island, 23.vii.2009, *Walker s.n.* (LE 261609); Mount Rai-Iz, 2.ix.2001, *Kholod s.n.* (LE 260167). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96892* (LE 232977); 17.vii.1996, *Zhurbenko 96891* (LE 232959). Cape Baranova, 10.vii.1996, *Zhurbenko 96893b* (LE 232937b). Studënaia River, 15.viii.1998, *Matveeva s.n.* (LE 233873). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95283b* (LE 233007b); 25.viii.1995, *Zhurbenko 95480* (LE 233733). – **CHUKOTKA AUTONOMOUS AREA.** Ėrguveem River, 6.viii.1970, *Galanin s.n.* (LE 232997).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2001, 2009a, 2009b).

***Rhymbocarpus geographici* (J. Steiner) Vouaux**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On thalli of *Rhizocarpon geminatum* and *Rhizocarpon* sp. Commensal or weak pathogen.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93110a* (LE 261709a). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 261629a).

REPORT. – Zhurbenko (2009b).

***Rhymbocarpus makarovae* Diederich & Etayo**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On *Porpidia* sp. (thallus). Commensal.

VOUCHERS. – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 30.vii.1975, *Makarova s.n.* (LE 233097). Lavrentiia settlement, 10.vii.1973, *Makarova s.n.* (LE 233087, holotype).

REPORT. – Diederich & Etayo (2000).

***Rhymbocarpus neglectus* (Vain.) Diederich & Etayo**

(≡ *Llimoniella neglecta* (Vain.) Triebel & Rambold)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (21). Medium-active. On thalli of *Lepraria alpina*, *L. gelida*, *L. neglecta*, and terricolous *Lepraria* spp. Commensal or occasionally a weak pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97347* (LE 233298). Olenka River mouth, 5.ix.1997, *Zhurbenko 97349* (LE 233238). – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Matochkin Shar Strait, 19.vii.1921, *Lynge s.n.* (herbarium unknown). – **YAMAL-NENETS AUTONOMOUS AREA.** Sob' River, 17.vii.1986, *Zhurbenko 86183* (LE 233188). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 15.vii.1996, *Zhurbenko 96114* (LE 207161), *Zhurbenko 96536* (LE 210480), *Zhurbenko 96873* (LE

232195). Studënaia River, 15.viii.1998, *Matveeva s.n.* (LE 233522). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9479* (LE 207160); 24.vii.1995, *Zhurbenko 95361* (LE 233176); 25.vii.1995, *Zhurbenko 95358a* (LE 233257a). South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95365* (LE 233346); 29.vii.1995, *Zhurbenko 95360* (LE 233177); 30.vii.1995, *Zhurbenko 95356* (LE 233217); 28.viii.1995, *Zhurbenko 95366* (LE 233256). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95357b* (LE 233207b). – PUTORANA PLATEAU. Bunisiak River mouth, 12.vii.1984, *Zhurbenko 84193* (LE 207159). Kapchuk Lake, 2.viii.1983, *Zhurbenko 83225* (LE 233288); 13.viii.1983, *Zhurbenko 83166* (LE 207158). – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 19.vii.1977, *Makarova s.n.* (LE 233266). Pitlekaĭ settlement, 1878–79, *Almquist s.n.* (herbarium unknown).

REPORTS. – Kümmerling et al. (1993), Zhurbenko (2007b, 2008, 2009a, 2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996); see also *Unguiculariopsis groenlandiae* in Erroneous and Doubtful Records.

***Rhymbocarpus pertusariae* Diederich, Zhurb. & Etayo**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Lepra panyrga* (thallus). Commensal or weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9462* (LE 233077).

REPORT. – Diederich & Etayo (2000).

***Rhymbocarpus stereocaulorum* (Alstrup & D. Hawksw.) Etayo & Diederich**

(≡ *Geltingia stereocaulorum* Alstrup & D. Hawksw.; ≡ *Llimoniella stereocaulorum* (Alstrup & D. Hawksw.) Hafellner)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (27). Medium-active. On thalli (pseudopodetia, occasionally phyllocladia) of *Stereocaulon alpinum*, *S. depressum*, *S. glareosum*, *S. groenlandicum*, *S. incrustatum*, and *S. rivulorum*. Commensal, gall-former.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Chugor'iakha River, 28.vii.1991, *M. P. Andreev s.n.* (UPS). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 9680a* (LE 207164a), *Zhurbenko 9681a* (LE 207162a), *Zhurbenko 9695* (LE 207169), *Zhurbenko 96635* (LE 232177). Cape Antseva, 6.viii.1997, *Matveeva s.n.* (LE 207650). Cape Baranova, 11.vii.1996, *Zhurbenko 9699* (LE 207163). – TAYMYR PENINSULA. Cape Cheliuskina, 4.viii.1974, *Matveeva s.n.* (LE 207168). Ragozinka River, 11.vii.1990, *Zhurbenko 90372* (LE 207710). Syrutaturku Lake, 14.viii.1994, *Pospelova s.n.* (LE 207166). Uboĭnaia River mouth, 9.viii.1990, *Zhurbenko 90364* (LE 207688), *Zhurbenko 90909a* (LE 233900a). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 982* (LE 233615), *Zhurbenko 9817* (LE 233575). Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98240* (LE 260033). Stolb Island, 12.viii.1998, *Zhurbenko 9811* (M). Tiksi settlement, 17.vii.1998, *Zhurbenko 9839* (LE 233605), *Zhurbenko 9849* (LE 233595); 24.viii.1998, *Zhurbenko 98273* (LE 233585). – NEW SIBERIAN ISLANDS. Bennetta Island, 28.vii.1989, *Zhurbenko 8973* (LE 207686); 4.viii.1989, *Zhurbenko 8981* (LE 207664), *Zhurbenko 8983a* (LE 207678a); 16.viii.1989, *Zhurbenko 8977* (LE 207685). Zhokhova Island, 31.vii.1989, *Samarskii s.n.* (LE 207167). – **CHUKOTKA AUTONOMOUS AREA.** Uelen settlement, 11.viii.1938, *Trushkovskiĭ s.n.* (LE 233545, LE 233555). – WRANGEL ISLAND. Krasnyĭ Flag River, 1.viii.1997, *Kholod s.n.* (LE 207165); Neizvestnaia River at its headwaters, 23.viii.1987, *Kholod s.n.* (LE 232128).

REPORTS. – Andreev (1994), Karatygin et al. (1999), Samarskii et al. (1997), Zhurbenko (2010a), Zhurbenko & Pospelova (2001), Zhurbenko & Santesson (1996).

***Roselliniella cladoniae* (Anzi) Matzer & Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli of *Cladonia subfurcata* and *Cladonia* sp. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** Sibiriakova Island, 8.vii.1989, *Kozhevnikova s.n.* (LE 309175). – **CHUKOTKA AUTONOMOUS AREA.** Ioni Lake, 3.vii.1977, *Makarova s.n.* (LE 261793).

REPORTS. – Zhurbenko & Alstrup (2004), Zhurbenko & Pino-Bodas (2017).

***Roselliniella pannariae* Matzer & Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Protopannaria pezizoides* (thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North-west of Piasino Lake, 17.vii.1983, *Zhurbenko 83231* (LE 260165). Ragozinka River, 13.vii.1990, *Zhurbenko 90700* (LE 260285).

REPORT. – Zhurbenko (2009b).

***Roselliniopsis gelidaria* (Mudd) Matzer**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Placopsis gelida* (thallus). Weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Mount Nauneson, 7.viii.1970, *Katenin s.n.* (LE 233273).

REPORT. – Zhurbenko (2009a).

***Roselliniopsis ventosa* (Rostr.) Alstrup**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Placopsis gelida* (cephalodia). Weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Klark River, viii.1986, *Dobrysh s.n.* (LE 233213).

REPORT. – Zhurbenko (2009a).

***Sagediopsis aspiciliae* (Vain.) Nik. Hoffm. & Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (4). Low-active. On thalli of *Aspilidea myrinii*, *Aspicilia* sp., and *Lecidea lapicida* var. *pantherina*. Commensal.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9351* (LE 261723). Sob' River, 17.vii.1986, *Zhurbenko 86130* (LE 261515). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Talnakh Region of Noril'sk city, 8.viii.1985, *Zhurbenko 8572* (LE). – **CHUKOTKA AUTONOMOUS AREA.** Ioni Lake, 30.vi.1977, *Makarova s.n.* (LE 261573).

REPORTS. – Zhurbenko (2002b, 2009b), Zhurbenko & Hafellner (1999).

***Sagediopsis campsteriana* (Linds.) D. Hawksw. & R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (6). Low-active. On apothecia and thalli of *Ochrolechia androgyna*, *O. frigida* (including *O. inaequatula*), and terricolous *Ochrolechia* spp. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97328* (LE 232889); 2.ix.1997, *Zhurbenko 97310* (LE 232577). Olenka River mouth, 7.ix.1997, *Zhurbenko 97304* (LE 232869). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 17.vii.2004, *Kholod s.n.* (LE 232781). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 83109* (LE 207402). – **CHUKOTKA AUTONOMOUS AREA.** Ioni Lake, 30.vii.1977, *Makarova s.n.* (LE 232919).

REPORTS. – Zhurbenko (1998, 2009d).

***Sagediopsis pertusariicola* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (13). Medium-active. On thalli of *Pertusaria coriacea* and terricolous *Pertusaria* spp. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 18.vii.1996, *Zhurbenko 96856* (LE 232624), *Zhurbenko 96873* (LE 232193). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96862* (LE 232569, holotype). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 22.viii.1995, *Zhurbenko 95274* (LE 232949). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90655* (UPS). – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98267* (LE 232879). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98268* (LE 232939). Tiksi settlement, 10.vii.1988, *Makarova s.n.* (LE 232909). YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 98269* (UPS). – NEW SIBERIAN ISLANDS. Bennetta Island, 23.vii.1989, *Zhurbenko 8963* (LE 207403, UPS); 30.vii.1989, *Zhurbenko 8966* (GZU, LE 207405). – **CHUKOTKA AUTONOMOUS AREA.**

Karval'ianskaia River, 23.vii.1982, *Afonina s.n.* (LE 232979). – WRANGEL ISLAND. Ushakovskoe settlement, 26.vii.1987, *Polozova s.n.* (LE 232969).

REPORT. – Zhurbenko (2009d); see also *Sagediopsis campsteriana* in Erroneous and Doubtful Records.

***Sclerococcum* cf. *aeruginosum* (Holien & Ihlen) Ertz & Diederich**

(≡ *Dactylospora aeruginosa* Holien & Ihlen)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Biatora subduplex* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 9.vii.1979, *Makarova s.n.* (LE 233368).

REPORT. – Zhurbenko (2009a).

***Sclerococcum ahtii* (Zhurb. & Pino-Bodas) Ertz & Diederich**

(≡ *Dactylospora ahtii* Zhurb. & Pino-Bodas)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (5). Low-active. On thalli of *Cladonia arbuscula*, *C. mitis*, and *C. rangiferina*. Commensal or facultative saprobe.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 27.viii.1998, *Matveeva s.n.* (LE 308885). – TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko* 95592 (LE 308880). Piasina River mouth, 6.viii.1993, *Kuvaev 2184* (LE 207407). – **CHUKOTKA AUTONOMOUS AREA.** Innepinkul'veem River, 10.viii.1951, *Ababkov s.n.* (LE 308796). Lorino settlement, 16.viii.1972, *Makarova s.n.* (LE 308781).

REPORT. – Pino-Bodas et al. (2017).

***Sclerococcum amygdalariae* (Triebel) Ertz & Diederich**

(≡ *Dactylospora amygdalariae* Triebel)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (24). Medium-active. On cephalodia, thalli, and occasionally apothecia of *Amygdalaria elegantior*, *A. panaeola*, *A. pelobotryon*, and *A. subdissentiens*. Commensal.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9344* (LE). Sob' River, 13.vii.1986, *Zhurbenko 86128* (LE 232127). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 28.vii.1982, *Titov s.n.* (LE 207078, LE 207079); 18.viii.1983, *Zhurbenko 83204* (LE 207350). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95341* (LE 233011). South of Levinson-Lessinga Lake, 29.vii.1995, *Zhurbenko 95342* (LE 232961). – **CHUKOTKA AUTONOMOUS AREA.** Baran'e Lake, 21.vii.1980, *Makarova s.n.* (LE 207384); 22.vii.1980, *Makarova s.n.* (LE 207222). Mount Ėlombal, 3.ix.1977, *M. P. Andreev s.n.* (M). Enurmino settlement, 27.vii.1972, *Makarova s.n.* (LE 232801). Gil'mymlineĭveem River, 21.vii.1977, *Makarova s.n.* (LE 207483). Inchoun settlement, 30.vii.1975, *Makarova s.n.* (LE 207337); 4.viii.1975, *Makarova s.n.* (LE 207227a). Lavrentiia settlement, 16.vii.1972, *Makarova s.n.* (LE 207140a); 11.vii.1973, *Makarova s.n.* (LE 207364, LE 207597); 25.vii.1973, *Makarova s.n.* (LE 207181); 31.vii.1973, *Makarova s.n.* (LE 206978). Loren River, 16.viii.1972, *Makarova s.n.* (LE 207225b, LE 207628b). Lorino settlement, 7.vii.1972, *Makarova s.n.* (LE 207409); 16.viii.1972, *Makarova s.n.* (LE 207225b, LE 207628b). Penkigneĭ Bay coast at the mouth of the Pestsovaia River, 10.viii.1978, *Katenin s.n.* (LE 233061). Puoten settlement, 23.vii.1972, *Makarova s.n.* (LE 232971). Televeem River, 18.vii.1979, *Makarova s.n.* (LE 207616). Vesnovannaia River, 12.viii.1980, *Makarova s.n.* (LE 207039).

REPORTS. – Karatygin et al. (1999), Triebel (1989), Zhurbenko (2002b, 2008, 2009a), Zhurbenko & Hafellner (1999).

***Sclerococcum athallinum* (Müll.Arg.) Ertz & Diederich**

(≡ *Dactylospora athallina* (Müll.Arg.) Hafellner)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Baeomyces rufus* (thallus). Commensal.

VOUCHER. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9769* (LE 207080).

REPORT. – Zhurbenko (2001).

***Sclerococcum attendendum* (Nyl.) Ertz & Diederich**

(≡ *Dactylospora attendenda* (Nyl.) Arnold)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (11). Low-active. On thalli, occasionally cephalodia, of *Pilophorus dovrensis* and *P. robustus*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83179* (LE 207081); 23.vii.1985, *Zhurbenko 8591* (LE 210403). – TAYMYR PENINSULA. North-west of Piasino Lake, 23.vii.1983, *Zhurbenko 8395* (LE 207082). — **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 17.viii.1979, *Makarova s.n.* (LE 210313). Gil'mymlineĭveem River, 18.vii.1977, *Makarova s.n.* (LE 210353); 21.vii.1977, *Makarova s.n.* (LE 207286); 26.vii.1977, *Makarova s.n.* (LE 207443a). Inchoun settlement, 4.viii.1975, *Makarova s.n.* (LE 210343). Televeem River, 23.vii.1979, *Makarova s.n.* (LE 207146b); 18.viii.1979, *Makarova s.n.* (LE 210333). Uelen settlement, 5.viii.1974, *Blagodatskikh s.n.* (LE 210363).

REPORTS. – Zhurbenko (1998), Zhurbenko & Hafellner (1999), Zhurbenko & Triebel (2005).

***Sclerococcum deminutum* (Th. Fr.) Ertz & Diederich**

(≡ *Dactylospora deminuta* (Th. Fr.) Triebel; = *Dactylospora rinodinicola* Alstrup & D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very frequent (140). Highly-active. On thalli, occasionally apothecia, of *Biatora cuprea*, *B. subduplex*, *Bryonora castanea*, *Bryoplaca tetraspora*, *Cladonia pocillum*, *C. pyxidata*, *C. rangiferina*, *Lecanora epibryon*, *L. geophila*, *Lecidea epiphaea*, *Lecidella wulfenii*, *Lecidoma demissum*, *Lepraria* sp, *Lopadium coralloideum*, *L. pezizoideum*, *Micarea assimilata*, *M. incrassata*, *Mycobilimbia carneoalbida*, *M. tetramera*, *Ochrolechia frigida*, *Phaeorrhiza nimbosa*, *P. sareptana* var. *sphaerocarpa*, *Pilophorus dovrensis*, *P. robustus*, *Protopannaria pezizoides*, *Psora rubiformis*, *Psoroma hypnorum*, *P. tenue* var. *boreale*, *Rinodina mniaraea*, *R. turfacea*, *Stereocaulon depressum*, and *S. groenlandicum*. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.vii.1997, *Zhurbenko 97354a* (LE 233323a). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 24.vii.1930, *Savicz 431* (LE 207098), *Savicz 456a* (LE 207095), *Savicz 1425* (LE 207201), *Savicz 1448a* (LE 309293); 2.viii.1930, *Savicz s.n.* (LE 207202), *Savicz 11a* (LE 207205); 15.viii.1979, *Safronova s.n.* (LE 261740). – NOVAYA ZEMLYA. Mashigina Bay, 1921, *Lynge s.n.* (O). – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 18.vii.1999, *O. V. Lavrinenko s.n.* (LE 261576a); 24.vii.1999, *O. V. Lavrinenko s.n.* (LE 261676). Seduiakha River, 3.viii.1998, *O. V. Lavrinenko s.n.* (LE 261526). – **YAMAL-NENETS AUTONOMOUS AREA.** Baĭdaratskaĭa Bay coast near IAraiakha River mouth, 6.viii.2007, *Zhdanov s.n.* (LE 260648). Neromaiakha River, 16.vii.1990, *Khitun s.n.* (LE 233263); 17.vii.1990, *Khitun s.n.* (LE 233338); Mount Rai-Iz, 26.vii.1993, *Zhurbenko 9334* (LE 308530); 27.vi.1993, *Zhurbenko 93146* (LE 260261). – **KRASNOYARSK TERRITORY.** – Russkiĭ Island, 16.vii.1993, *Melnikov s.n.* (LE 308535). – Sibiriakova Island, 13.vii.1989, *Kozhevnikova s.n.* (LE 207096, 207097); 17.vii.1989, *Kuvaev s.n.* (LE 207088). – PUTORANA PLATEAU. South of Aian Lake, 30.viii.1984, *Zhurbenko 84214* (LE 207085). Kapchuk Lake, 13.viii.1983, *Zhurbenko 83230* (LE 260116); 15.viii.1983, *Zhurbenko 83181* (LE 207089). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 15.vii.1996, *Zhurbenko 96128* (LE 207635), *Zhurbenko 961015* (LE 261586); 17.vii.1996, *Zhurbenko 96930* (LE 233922), *Zhurbenko 96937b* (LE 233223b), *Zhurbenko 961009* (LE 261756), *Zhurbenko 961013* (LE 261656), *Zhurbenko 961014* (LE 261646); 18.vii.1996, *Zhurbenko 96750* (LE 232106), *Zhurbenko 96836* (LE), *Zhurbenko 96938* (LE 233373), *Zhurbenko 96940* (LE 233393), *Zhurbenko 96990* (LE 260238). Cape Antseva, 31.vii.1997, *Matveeva s.n.* (LE 233317); 6.viii.1997, *Matveeva s.n.* (LE 233156b); 7.viii.1997, *Matveeva s.n.* (LE 260217); 14.viii.1997, *Matveeva s.n.* (LE 233218); 17.viii.1997, *Matveeva s.n.* (LE 233258); 16.viii.1998, *Matveeva s.n.* (LE 260061, LE 260272), *Matveeva s.n.* (LE 261685); 19.viii.1998, *Matveeva s.n.* (LE 233313, LE 233397); 21.viii.1998, *Matveeva s.n.* (LE 260196b); 25.viii.1998, *Matveeva s.n.* (LE 233306, LE 233308); 1.ix.1998, *Matveeva s.n.* (LE 233384, LE 233264); 20.vii.2000, *Matveeva s.n.* (LE 232132); 23.vii.2000, *Matveeva s.n.* (LE 232132). Cape Baranova, 10.vii.1996, *Zhurbenko 961011* (LE 261616); 12.vii.1996, *Zhurbenko 96994a* (LE 260227a); 13.vii.1996, *Zhurbenko 961010b* (LE 261707b), *Zhurbenko 961032* (LE 308918); 20.vii.1996, *Zhurbenko 96839* (LE 260297). Golysheva River, 4.viii.2000, *Matveeva s.n.* (LE 260206b). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96539* (LE 232112), *Zhurbenko 961012* (LE 261556). Ostantsovaia River, 12.vii.1996, *Zhurbenko 96127* (LE 207639b). – TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95397* (LE 233163). Cape Kosistyĭ, 7.viii.1996, *Kirtsideli s.n.* (LE 260231, LE 260257). Krasnaia River, 10.viii.1994, *Zhurbenko 94174* (UPS). Krasnoe Lake, 18.viii.1995, *Zhurbenko 95401b* (LE

233302b). North of Levinson-Lessinga Lake, 27.viii.1994, *Zhurbenko 9459b* (LE 207489b), *Zhurbenko 9461* (LE 261565); 21.vii.1995, *Zhurbenko 95547* (LE 261547); 22.vii.1995, *Zhurbenko 95516* (LE 260111); 10.viii.1995, *Zhurbenko 95381* (LE 233325); 20.viii.1995, *Zhurbenko 95548* (LE 261697), *Zhurbenko 95380* (LE 233315); 26.viii.1995, *Zhurbenko 95519* (LE 261680). South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95507* (LE 260106); 30.vii.1995, *Zhurbenko 95504* (LE 260237); 31.vii.1995, *Zhurbenko 95556* (LE 261776); 1.viii.1995, *Zhurbenko 95555* (LE 261626); 28.viii.1995, *Zhurbenko 95398* (LE 233303). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95357a* (LE 233207a). North-west of Piasino Lake, 17.vii.1983, *Zhurbenko 8358* (LE 261516); 23.vii.1983, *Zhurbenko 8393* (LE 207203); 24.vii.1983, *Zhurbenko 83233* (LE 261686), *Zhurbenko 83106a* (LE 309296a); 26.vii.1999, *Zanokha s.n.* (LE 261726). Ragozinka River, 24.vii.1990, *Zhurbenko 90361* (LE 207092). Syrutaturku Lake, 12.vii.1994, *Pospelova s.n.* (LE 207083); 22.viii.1994, *Pospelova s.n.* (LE 207204). – **REPUBLIC OF SAKHA (YAKUTIA).** Ambarchik settlement, 15.viii.2002, *Walker s.n.* (LE 309295). Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98256* (LE 232763), *Zhurbenko 98385* (LE 260065). Khas-Khatyn-Dzhiete cabin, 16.viii.1987, *Perfil'eva s.n.* (LE 261546). Cape Krest-Tumsa, 14.viii.1987, *Perfil'eva s.n.* (LE 261566); 4.viii.1998, *Zhurbenko 9835* (LE 233512), *Zhurbenko 98228* (LE 308527), Zhurbenko *98397* (LE 261666). Tiksi settlement, 18.vii.1998, *Zhurbenko 98156* (LE 260212), *Zhurbenko 98389* (LE 261710). – NEW SIBERIAN ISLANDS. Bennetta Island, 28.vii.1989, *Zhurbenko 8964* (LE 207084). Zhokhova Island, 31.vii.1989, *Samarskii s.n.* (LE 207091); 1989, *Samarskii s.n.* (LE 207087). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 8.vii.1979, *Makarova s.n.* (LE 207619); 9.vii.1979, *Makarova s.n.* (LE 233294, LE 233248). Chegitun' River at its confluence with the Khesmymken River, 15.viii.1982, *Katenin s.n.* (LE 207621a). Ėgvekinot settlement, 2.vii.1970, *Makarova s.n.* (LE 233233); 26.vii.1970, *Makarova s.n.* (LE 260292). Enurmino settlement, 27.vii.1972, *Makarova s.n.* (LE 260035). Ėrguveem River, 9.vii.1970, *Galanin s.n.* (LE 261716); 14.viii.1970, *Galanin s.n.* (LE 261696). Gil'mymlineĭveem River, 5.vii.1977, *Makarova s.n.* (LE 207627); 20.vii.1977, *Makarova s.n.* (LE 207623); 23.vii.1977, *Makarova s.n.* (LE 207622). Inchoun settlement, 9.viii.1975, *Makarova s.n.* (LE 261596). Ioni Lake, 30.vi.1977, *Makarova s.n.* (LE 207625, LE 261596); 5.vii.1977, *Makarova s.n.* (LE 207627). Iskaten' Ridge, 10.viii.1971, *Yurtsev s.n.* (LE 261665). Koliuchinskaia Bay, 21.viii.1980, *Katenin & Zhurbenko s.n.* (LE 260118); 29.viii.1980, *Katenin & Zhurbenko s.n.* (LE 233358a). Kurupka River, 2.viii.1987, *Katenin s.n.* (LE 261636); 15.viii.1987, *Katenin s.n.* (LE 233208). Lavrentiia settlement, 10.vii.1973, *Makarova s.n.* (LE 260151). Lorino settlement, 7.vii.1972, *Makarova s.n.* (LE 207620). Penkigneĭ Bay coast at the mouth of the Pestsovaia River, 13.viii.1978, *Katenin s.n.* (LE 261606). Pepenveem River, 2.vii.1970, *Makarova s.n.* (LE 233233). Pitlekaĭ settlement, 1878–79, *Almquist s.n.* (S). Provideniia settlement, 5.vii.1983, *Makarova s.n.* (LE 233314). Puoten settlement, 21.vii.1972, *Makarova s.n.* (LE 261506a). – WRANGEL ISLAND. Gusinaia River, 9.viii.1991, *Kholod s.n.* (LE 210389); 19.viii.1991, *Kholod s.n.* (LE 210477). Neizvestnaia River at its headwaters, 15.vii.1987, *Kholod s.n.* (LE 210439); 26.vii.1987, *Yurtsev s.n.* (LE 260198); 9.viii.1987, *Kholod s.n.* (LE 210419). Neizvestnaia River in its middle reaches, 3.ix.1996, *Kholod s.n.* (LE 261706). Neozhidannaia River, 19.viii.1992, *Kholod s.n.* (LE 210303). Tundrovaia River in its middle reaches, 22.viii.1995, *Kholod s.n.* (LE 210339); Tundrovaia River in its lower reaches, 1996, *Kholod s.n.* (LE 233203); 9.viii.1996, *Kholod s.n.* (LE 261770); 22.viii.1996, *Kholod s.n.* (LE 260275).

REPORTS. – Karatygin et al. (1999), Keissler (1928), Samarskii et al. (1997), Vainio (1909), Zhurbenko (1998, 2002b, 2008, 2009a, 2009b, 2010a), Zhurbenko & Alstrup (2004), Zhurbenko & Hafellner (1999), Zhurbenko & Pospelova (2001), Zhurbenko & Pino-Bodas (2017), Zhurbenko & Santesson (1996), Zhurbenko & Triebel (2005), Zhurbenko & Zhdanov (2013), Zhurbenko et al. (2005); see also *Dactylospora rinodinicola* in Erroneous and Doubtful Records.

***Sclerococcum frigidum* (Hafellner) Ertz & Diederich**

(≡ *Dactylospora frigida* Hafellner)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (4). Low-active. On *Brigantiaea fuscolutea* (thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 10.viii.1995, *Zhurbenko 95377* (LE 233195); 20.viii.1995, *Zhurbenko 95378* (LE 233185); 26.viii.1995, *Zhurbenko 95375* (LE 233205). – **CHUKOTKA AUTONOMOUS AREA.** Iskaten' Ridge, 14.vii.1971, *Makarova s.n.* (LE 233215).

REPORT. – Zhurbenko (2009a).

***Sclerococcum gelidarum* Etayo & F. Berger**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Placopsis gelida* (cephalodia, thallus). Commensal or weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Lavrentiia settlement, 1.viii.1973, *Makarova s.n.* (LE 233392).

REPORT. – Zhurbenko (2009a).

***Sclerococcum glaucomarioides* (Tuck.) Ertz & Diederich**

(≡ *Dactylospora glaucomarioides* (Tuck.) Hafellner)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (8). Low-active. On thalli, occasionally apothecia, of *Megaspora verrucosa*, *Ochrolechia* cf. *frigida*, *O. upsaliensis*, and *Ochrolechia* sp. Commensal or occasionlly weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Seduiakha River, 3.viii.1998, *O. V. Lavrinenko s.n.* (LE 233246). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83172b* (LE 207209b). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9454* (LE 207207); 29.vii.1994, *Zhurbenko 9428a* (LE 207613a), *Zhurbenko 94108* (LE 207208); 24.vii.1995, *Zhurbenko 95374* (LE 233247); 22.viii.1995, *Zhurbenko 95373* (LE 233387). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98299* (LE 233267).

REPORTS. – Zhurbenko (2009a, 2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Sclerococcum homoclinellum* (Nyl.) Ertz & Diederich**

(≡ *Dactylospora homoclinella* (Nyl.) Hafellner)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Lecanora argentea* (thallus, occasionally apothecia). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Televeem River, 23.vii.1979, *Makarova s.n.* (LE 261555).

REPORT. – Zhurbenko (2009b).

***Sclerococcum montagnei* Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Lecanora rupicola* (apothecia, thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Iskaten' Ridge, 1.vii.1971, *Makarova s.n.* (LE 261775).

REPORT. – Zhurbenko (2009b).

***Sclerococcum parasiticum* (Flörke) Ertz & Diederich**

(≡ *Dactylospora parasitica* (Flörke) Zopf)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (5). Medium-active. On thalli, occasionally apothecia, of *Blastenia ammiospila*, *Megaspora verrucosa*, *Pertusaria* '*rupestris*', *Psoroma tenue* var. boreale, and *Tetramelas insignis*. Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Ziegler Island, 25.vii.2019, *Chesnokov 72* (LE F-350212), *Konoreva 111* (LE F-350214). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnaia River, 12.viii.1994, *Zhurbenko 94317* (LE 207210). North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 9492* (LE 207211). South of Levinson-Lessinga Lake, 30.vii.1995, *Zhurbenko 95325* (LE 233073).

REPORTS. – Chesnokov & Konoreva (2023), Zhurbenko (2009a), Zhurbenko & Santesson (1996).

***Sclerococcum pertusariicola* (Tuck.) Ertz & Diederich**

(≡ *Dactylospora pertusariicola* (Tuck.) Hafellner)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (4). Low-active. On *Pertusaria cribellata* (apothecia, thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 26.viii.1994, *Zhurbenko 94435* (GZU), *Zhurbenko 94442* (LE 207213); 29.viii.1994,

Zhurbenko 9428 (LE 207212, UPS); 21.vii.1995, *Zhurbenko 951* (distributed in Fungi Lichenicoli Exsiccati (Santesson 1998)).

REPORTS. – Santesson (1998), Zhurbenko (2002b), Zhurbenko & Santesson (1996).

***Sclerococcum purpurascens* (Triebel) Ertz & Diederich**

(≡ *Dactylospora purpurascens* Triebel)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (8). Low-active. On thalli, occasionally apothecia and cephalodia, of *Amygdalaria elegantior*, *A. panaeola*, *A. pelobotryon*, and *Pilophorus robustus*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 2.viii.1983, *Zhurbenko 83219* (LE 232821); 18.viii.1983, *Zhurbenko 83220* (LE 232811); 19.vii.1985, *Zhurbenko 8562* (LE 207214). – TAYMYR PENINSULA. Dudinka town, 4.viii.1876, *Brenner s.n.* (S). North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 83138* (LE 207215). — **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 5.vii.1977, *Makarova s.n.* (LE 210323); 21.vii.1977, *Makarova s.n.* (LE 207618, LE 210393).

REPORTS. – Triebel (1989), Zhurbenko (2009a), Zhurbenko & Hafellner (1999).

***Sclerococcum rhyparizae* (Arnold) Ertz & Diederich**

(≡ *Dactylospora rhyparizae* Arnold)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Bryodina rhypariza* (apothecia). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 11.viii.1982, *Titov s.n.* (LE 207216).

REPORT. – Zhurbenko & Hafellner (1999).

***Sclerococcum saxatile* (Schaer.) Ertz & Diederich**

(≡ *Dactylospora saxatilis* (Schaer.) Hafellner)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Lepra* cf. *excludens* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 26.viii.1994, *Zhurbenko 94433* (LE 207217).

REPORT. – Zhurbenko & Santesson (1996).

***Sclerococcum urceolatum* (Th. Fr.) Ertz & Diederich**

(≡ *Buellia urceolata* Th. Fr.; ≡ *Dactylospora urceolata* (Th. Fr.) Arnold; ≡ *Leciographa urceolata* (Th. Fr.) Rehm)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli of *Lecidella wulfenii* and *Protothelenella sphinctrinoides*. Commensal.

VOUCHERS. – **MURMANSK REGION.** Oleniĭ Island. – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Mashigina Bay, 1921, *Lynge s.n.* (herbarium unknown).

REPORTS. – Keissler (1928), Nylander (1866), Zhurbenko (2001).

***Sclerococcum zhurbenkoi* F. Berger & E. Zimm.**

CHARACTERIZATION. – Sometimes visible to the naked eye. Infrequent (13). Medium-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* (mostly) and *T. vermicularis* var. *vermicularis*. Pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hayes Island, 11.viii.2010, *Walker s.n.* (LE 310234). Hooker Island, 29.vii.1930, *Savicz s.n.* (LE 310235). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND, Cape Baranova, 9.vii.1996, *Zhurbenko 961037* (LE 310232). – TAYMYR PENINSULA. East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95612* (LE 310238). North of Levinson-Lessinga Lake, 3.viii.1994, *Zhurbenko 94513* (LE 310245); 20.viii.1995, *Zhurbenko 95613* (LE 310237); 26.viii.1995, *Zhurbenko 95611* (LE 310239). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95609* (LE 310241), *Zhurbenko 95614* (LE 310236). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95608* (LE 310242), *Zhurbenko 95610*, (LE 310240). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 17.vii.1998, *Zhurbenko 98418* (LE 310244); 24.viii.1998, *Zhurbenko 98419* (LE 310243).

REPORT. – Zhurbenko (2022).

***Scutula epiblastematica* (Wallr.) Rehm**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Peltigera canina* (thallus). Weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 30.viii.1995, *Zhurbenko* 95496 (LE 260240).

REPORT. – Zhurbenko (2009b).

***Scutula miliaris* (Wallr.) Trevis.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli of *Peltigera* spp. Commensal.

VOUCHERS. – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 8.vii.1979, *Makarova s.n.* (LE 308973). Lavrentiia settlement, 11.vii.1973, *Makarova s.n.* (LE 308972).

REPORT. – Karatygin et al. (1999).

***Scutula tuberculosa* (Th. Fr.) Rehm**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (15). Medium-active. On thalli, occasionally apothecia, of *Solorina saccata*, *S. bispora* var. *bispora*, and *S. bispora* var. *subspongiosa*. Commensal or sometimes weak pathogen.

VOUCHERS. – **KOMI REPUBLIC.** Elets River, 28.vi.1993, *Zhurbenko 93219* (LE 233753). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96967* (LE 233812). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 25.viii.1994, *Zhurbenko 94454b* (LE 207070b); 10.viii.1995, *Zhurbenko 95483* (LE 233702); 25.viii.1995, *Zhurbenko 95479* (LE 233793). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98359* (LE 233713). Samoĭlovskiĭ Island, 11.vii.1988, *Makarova s.n.* (LE 233728, LE 260117a); 12.vii.1988, *Makarova s.n.* (LE 233738); 30.vii.1998, *Zhurbenko 98361* (LE 233802). – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 8.vii.1979, *Makarova s.n.* (LE 233708). Gil'mymlineĭveem River, 18.vii.1977, *Makarova s.n.* (LE 233722); 19.vii.1977, *Makarova s.n.* (LE 233743); 20.vii.1977, *Makarova s.n.* (LE 233752a). Lavrentiia settlement, 11.vii.1973, *Makarova s.n.* (LE 233718). – WRANGEL ISLAND. Verkhniaia Mamontovaia River, 1996, *Kholod s.n.* (LE 233792).

REPORTS. – Wedin et al. (2007), Zhurbenko (2009b).

***Skyttea tephromelarum* Kalb & Hafellner**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Tephromela atra* (thallus). Commensal.

VOUCHER. – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 13.viii.1987, *Perfil'eva s.n.* (LE 261794a).

REPORT. – Zhurbenko (2009b).

***Sphaerellothecium abditum* Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On saxicolous *Lecidea* sp. (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Iskaten' Ridge, 17.vii.1971, *Makarova s.n.* (LE 207061a).

REPORT. – Karatygin et al. (1999).

***Sphaerellothecium araneosum* (Arnold) Zopf**

(= *Echinothecium glabrum* M.S. Christ., Alstrup & D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (17). Medium-active. On thalli, occasionally apothecia, of *Ochrolechia* cf. *androgyna*, *O. frigida* (including f. *lapuënsis*), *O. upsaliensis*, and muscicolous *Ochrolechia* sp. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 21.viii.1997, *Zhurbenko 97128* (M; distributed in Microfungi Exsiccati (Triebel 2003)). 15 km N of Tumannyĭ settlement, 19.viii.1997, *Zhurbenko 97312* (distributed in Mycotheca Petropolitana (Morozova & Popov 2008)). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 24.vii.1930, *Savicz 484* (LE

207485), *Savicz 1448bisa* (LE); 2.viii.1930, *Savicz 6a* (LE 207502). – Scott Kelly Island, 25.vii.1930, *Savicz 993b* (LE 207493). – **YAMAL-NENETS AUTONOMOUS AREA.** Belyĭ Island, 23.vii.2009, *Walker s.n.* (LE 261698). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. South of Aian Lake, 29.viii.1984, *Zhurbenko 84226* (LE 207495). Kapchuk Lake, 15.viii.1983, *Zhurbenko 83171* (LE 207506). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9459a* (LE 207489a); 3.viii.1994, *Zhurbenko 94254* (UPS); 29.viii.1994, *Zhurbenko 9416b* (LE), *Zhurbenko 9424b* (LE 207499b). North-west of Piasino Lake, vii.1983, *Zhurbenko s.n.* (LE 308969). Ragozinka River, 11.vii.1990, *Zhurbenko 90360* (LE 207491). – **REPUBLIC OF SAKHA (YAKUTIA).** NEW SIBERIAN ISLANDS. Zhokhova Island, 31.vii.1989, *Samarskii s.n.* (LE 207488). – **CHUKOTKA AUTONOMOUS AREA**. Lorino settlement, 6.vii.1972, *Makarova s.n.* (LE 210305).

REPORTS. – Morozova & Popov (2008), Samarskii et al. (1997), Triebel (2003), Zhurbenko (1998, 2001, 2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996), Zhurbenko & Triebel (2008).

***Sphaerellothecium arctoparmeliae* (Brackel & Schiefelbein) Diederich, Zhurb. & Brackel**

(≡ *Trimmatostroma arctoparmeliae* Brackel & Schiefelbein)

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very rare (2). Low-active. On thalli of *Arctoparmelia centrifuga* and *A. separata*. Commensal or pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97425* (LE 310190). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 18.vi.1996, *Zhurbenko 961035* (LE 310191).

REPORT. – Diederich (2021).

***Sphaerellothecium cladoniae* (Alstrup & Zhurb.) Hafellner**

(≡ *Sphaerellothecium araneosum* (Arnold) Zopf var. *cladoniae* Alstrup & Zhurb.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (48). Medium-active. On thalli of *Cladonia cariosa*, *C. coccifera*, *C. macroceras*, *C. pocillum* (mostly), *C. pyxidata*, and *C. symphycarpia*. Commensal or weak pathogen.

VOUCHERS. – **MURMANSK REGION.** Olenka River mouth, 5.ix.1997, *Zhurbenko 97418* (LE 308921). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 1930, *Savicz 1461* (C). – NOVAYA ZEMLYA. Ledianaia Gavan' Bay, 1.ix.1995, *Kuliev s.n.* (LE 232528). Matochkin Shar Strait, 11.vii.1921, *Lynge s.n.* (C). – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 18.vii.1999, *O. V. Lavrinenko s.n.* (M). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. South of Aian Lake, 13.viii.1984, *Zhurbenko 84244* (LE 207640). Kapchuk Lake, 13.viii.1983, *Zhurbenko 83161* (LE 207221c), *Zhurbenko 83162* (LE 207220). Sobach'e Lake, vii.1996, *Zanokha s.n.* (LE 232615, LE 232723). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 13.vii.1996, *Zhurbenko 96421* (M). Golysheva River, 6.viii.2000, *Matveeva s.n.* (LE 232170b). – TAYMYR PENINSULA. Aia-Turku Lake, 14.viii.1975, *Sokolova s.n.* (LE 308696). Bol'shaia Bootankaga River, 29.vii.1991, *Kuvaev s.n.* (LE). North of Levinson-Lessinga Lake, 22.vii.1995, *Zhurbenko 95220* (M). South of Levinson-Lessinga Lake, 31.vii.1995, *Zhurbenko 95216* (LE 232722); 1.viii.1995, *Zhurbenko 95212* (LE 232182). Malaia Balakhnia River mouth, 25.vii.1996, *Kirtsideli s.n.* (LE 232733). Oboĭnoe settlement, 3.viii.1996, *Kirtsideli s.n.* (LE 232721). – **REPUBLIC OF SAKHA (YAKUTIA).** Samoĭlovskiĭ Island, 28.vii.1998, *Zhurbenko 98224* (LE 232784). Stolb Island, 12.viii.1998, *Zhurbenko 98237* (LE 232662). Tiksi settlement, 18.vii.1998, *Zhurbenko 98416b* (LE 308912b); 24.viii.1998, *Zhurbenko 98232* (M), *Zhurbenko 98233* (LE 232743). – **CHUKOTKA AUTONOMOUS AREA.** Chegitun' River at its confluence with the Vetgyvaam River, 12.viii.1991, *Yurtsev s.n.* (LE). Ėrguveem River, 8.vii.1967, *Zimarskaia s.n.* (LE). Iskaten' Ridge, 2.vii.1971, *Makarova s.n.* (LE 232134). Lavrentiia settlement, 9.viii.1972, *Makarova s.n.* (LE 232589); 11.vii.1973, *Makarova s.n.* (LE). Loren River, 13.viii.1972, *Makarova s.n.* (LE 232659). Paliavaam settlement, 2.viii.1980, *Polozova s.n.* (LE). Sireniki settlement, 23.vii.1986, *Katenin s.n.* (LE 232539). – WRANGEL ISLAND. Gusinaia River, 24.vii.1979, *Polozova s.n.* (LE); 1991, *Kholod s.n.* (M); 18.vii.1991, *Kholod s.n.* (LE); 28.vii.1991, *Kholod s.n.* (LE 232137, LE 232762); 17.viii.1991, *Shtrik s.n.* (LE); 19.viii.1991, *Kholod s.n.* (LE); 30.vii.1996, *Kholod s.n.* (LE 232637). Krasnyĭ Flag River, 18.vii.1997, *Kholod s.n.* (LE 210340). Mamontovaia River, 4.viii.1995, *Kholod s.n.* (LE). Neizvestnaia River in its middle reaches, 1986, *Dobrysh s.n.* (LE); 9.viii.1995, *Kholod s.n.* (LE). Neizvestnaia River at its headwaters, 8.viii.1987, *Kholod s.n.* (LE); 9.viii.1987, *Kholod s.n.* (LE); 10.viii.1987, *Kholod s.n.* (LE);

23.viii.1987, *Kholod s.n.* (LE). Somnitel'naia River, 1985, *Yurtsev s.n.* (LE); 6.viii.1986, *Polozova s.n.* (LE 232686).

REPORTS. – Zhurbenko (2008), Zhurbenko & Alstrup (2004), Zhurbenko & Pino-Bodas (2017).

***Sphaerellothecium cladoniicola* E.S. Hansen & Alstrup**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Infrequent (16). Medium-active. On thalli of *Cladonia arbuscula* (mostly), *C. rangiferina*, and *C. stygia.* Pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko 901108* (LE 308577). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 961031* (LE 308917); 17.vii.1996, *Zhurbenko 96408* (LE 308551). Cape Antseva, 1.viii.1997, *Matveeva s.n.* (LE 308904). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 10.viii.1995, *Zhurbenko 95596* (LE 308894). Osipovka River, 18.vii.1990, *Zhurbenko 901104* (LE 308564). Uboinaya River mouth, 5.viii.1990, *Zhurbenko 901109* (LE 308580). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 17.vii.1998, *Zhurbenko 98413* (LE 308890). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 10.viii.1979, *Makarova s.n.* (LE 308803). Baran'e Lake, 24.vii.1980, *Makarova s.n.* (LE 308769). Ėlvineĭveem River, 21.vi.1967, *Yurtsev s.n.* (LE 308764). Ėnurmino settlement, 1.viii.1972, *Makarova s.n.* (LE 308799). Inchoun settlement, 2.viii.1975, *Makarova s.n.* (LE 308790). Mount Razdel'naia, 1977, *M. P. Andreev s.n.* (C). – WRANGEL ISLAND. Kulikovyĭ Brook, 23.viii.1992, *Kholod s.n.* (LE 308879). Somnitel'naia River, 9.viii.1984, *Kholod s.n.* (LE 308583).

REPORTS. – Hansen & Alstrup (1995), Zhurbenko & Pino-Bodas (2017).

***Sphaerellothecium contextum* Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (7). Low-active. On the apothecium discs of saxicolous *Lecanora* sp. and *Protoparmelia badia*. Pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 26.viii.1995, *Zhurbenko 95569a* (LE 261783a). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 19.vii.1998, *Zhurbenko 98300* (LE 233165). YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 98313* (LE 233212). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 6.viii.1979, *Makarova s.n.* (LE 207335); 17.viii.1979, *Makarova s.n.* (LE 233332). Inchoun settlement, 29.vii.1975, *Makarova s.n.* (LE 207433). Puoten settlement, 23.vii.1972, *Makarova s.n.* (LE 261674).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2009a, 2009b).

***Sphaerellothecium epilecanora* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Low-active. On *Lecanora epibryon* (apothecia). Possibly a pathogen or saprobe.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Seduiakha River, 3.viii.1998, *O. V. Lavrinenko s.n.* (LE 260957). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98422* (LE 261128b). Stolb Island, 12.viii.1998, *Zhurbenko 98423* (LE 261068). – **CHUKOTKA AUTONOMOUS AREA.** Iskaten' Ridge, 29.vii.1971, *Katenin s.n.* (LE 261176). Puoten settlement, 23.vii.1972, *Makarova s.n.* (LE 260937).

REPORT. – Zhurbenko & Brackel (2013).

***Sphaerellothecium icmadophilae* (R. Sant.) Zhurb.**

(≡ *Stigmidium icmadophilae* R. Sant.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Icmadophila ericetorum* (apothecia, thallus). Weak pathogen.

VOUCHER. – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 24.vii.2007, *Zhurbenko 0714* (LE 210376).

REPORT. – Zhurbenko (2008).

***Sphaerellothecium minutum* Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (46). Medium-active. On thalli, including talline margins of apothecia, of *Sphaerophorus fragilis* and *S. globosus*. Commensal, weak pathogen or facultative saprobe.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97318* (LE 232739). Olenka River mouth, 6.ix.1997, *Zhurbenko 97321* (LE 232719). Teriberka settlement,

7.viii.1977, *Dombrovskaia s.n.* (LE 232572). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Scott Kelly Island, 25.vii.1930, *Savicz s.n.* (LE 207503). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 24.vii.2007, *Zhurbenko 0715* (LE 210358). – **YAMAL-NENETS AUTONOMOUS AREA.** Neromaiakha River, 16.vii.1990, *Khitun s.n.* (LE 232607). Obskaia Region of Labytnangi town, 14.vii.1995, *Sumina s.n.* (LE 232124). Mount Rai-Iz, 27.vi.1993, *Zhurbenko 93128* (LE 232109); 27.vii.2004, *Kholod s.n.* (LE 210460). Saletaiakha River, 9.viii.1990, *Khitun s.n.* (LE 232146). – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko 901012* (LE 232562). Geiberg Islands, viii.1951, *Musina s.n.* (LE 232596). Sibiriakova Island, 17.vii.1990, *Kuvaev s.n.* (LE 232677b). Troĭnoĭ Island, 10.vii.1992, *Kozhevnikov s.n.* (LE 232579). – PUTORANA PLATEAU. Kapchuk Lake, 13.viii.1983, *Zhurbenko 83189* (LE 207504). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 27.viii.1998, *Matveeva s.n.* (LE 232592). Cape Baranova, 10.vii.1996, *Zhurbenko 96887* (LE 232644); 14.vii.1996, *Zhurbenko 96885* (LE 232600). Golysheva River, 3.viii.2000, *Matveeva s.n.* (LE 232131). –OKTIABR'SKOĬ REVOLYUTSII ISLAND. Cape Massivnyĭ, 16.viii.2007, *Gavrilo s.n.* (LE 210425). Mount Serp i Molot, 17.vii.1985, *Gavrilo s.n.* (LE 232560). – TAYMYR PENINSULA. Bol'shaia Bootankaga River, 22.vii.1991, *Kuvaev s.n.* (LE 232155a). North of Levinson-Lessinga Lake, 30.viii.1995, *Zhurbenko 95259* (LE 232123). South of Levinson-Lessinga Lake, 28.viii.1995, *Zhurbenko 95264* (LE 232663). Piasina River mouth, 22.vii.1993, *Kuvaev s.n.* (GZU); 28.vii.1993, *Kuvaev s.n.* (LE 207505). North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 83105* (LE 232746). Ragozinka River, 5.vii.1990, *Zhurbenko 901008* (LE 232685); 13.vii.1990, *Zhurbenko 901002b* (LE 232144b). Uboĭnaia River mouth, 1.viii.1990, *Zhurbenko 901005b* (LE 232730b). – **REPUBLIC OF SAKHA (YAKUTIA).** Ambarchik settlement, 16.viii.2002, *Walker s.n.* (LE); Tiksi settlement, 17.vii.1998, *Zhurbenko 98266* (LE 232635); 24.viii.1998, *Zhurbenko 98265a* (LE 232649a). NEW SIBERIAN ISLANDS. Zhokhova Island, viii.1989, *Samarskii s.n.* (LE). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 22.vi.1971, *Makarova s.n.* (LE 232602). Ėgvekinot settlement, 23.vi.1970, *Makarova s.n.* (LE 232745). Ėrguveem River, 5.vii.1967, *Zimarskaia s.n.* (LE 232776). Inchoun settlement, 6.viii.1975, *Makarova s.n.* (LE 232751). Ioni Lake, 30.vi.1977, *Makarova s.n.* (LE 232541); 10.vii.1977, *Makarova s.n.* (LE 232790). Lorino settlement, 7.vii.1972, *Makarova s.n.* (LE 232767). Mount Nauneson, 27.vii.1970, *Katenin s.n.* (LE 232558). Sireniki settlement, 8.vii.1986, *Katenin s.n.* (LE 232716). Televeem River, 18.vii.1979, *Makarova s.n.* (LE 232630). Utesiki settlement, 22.viii.1948, *Avramchik s.n.* (LE). – WRANGEL ISLAND. Gusinaia River, 23.viii.1991, *Kholod s.n.* (LE 210407).

REPORTS. – Zhurbenko (1998, 2008), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996), Zhurbenko et al. (2005).

***Sphaerellothecium parmeliae* Diederich & Etayo**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Rare (5). Low-active. On *Parmelia omphalodes* (thallus). Pathogen.

VOUCHERS. – **MURMANSK REGION.** Olenka River mouth, 5.ix.1997, *Zhurbenko 97345* (LE 233310). Shel'pino Bay, 4.ix.1997, *Zhurbenko 97344* (LE 233170). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Bikada River, vii.1989, *Pospelova s.n.* (LE 233398; as *S.* cf. *parmeliae*). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 20.vi.1971, *Makarova s.n.* (LE 264299; as *S.* cf. *parmeliae*). Ėnmyvaam River, 30.vi.1980, *Makarova s.n.* (LE 261373; as *S.* cf. *parmeliae*).

REPORTS. – Zhurbenko (2009a), Zhurbenko & Zheludeva (2015).

***Sphaerellothecium phaeorrhizae* Diederich & Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On apothecia and thalli of *Phaeorrhiza nimbosa* and *P. sareptana* var. *sphaerocarpa*. Commensal or weak pathogen.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 98311* (LE 233242). – **CHUKOTKA AUTONOMOUS AREA.** Ėnmyvaam River, 30.vi.1980, *Makarova s.n.* (LE 233192); 4.vii.1980, *Makarova s.n.* (LE 233172).

REPORT. – Zhurbenko (2009a).

***Sphaerellothecium pumilum* (Lettau) Nav.-Ros., Cl. Roux & Hafellner**

(≡ *Stigmidium pumilum* (Lettau) Matzer & Hafellner)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (11). Medium-active. On thalli of *Physcia albinea* and *P. caesia*. Commensal or weak pathogen.

VOUCHERS. – **KOMI REPUBLIC.** Elets River, 29.vi.1993, *Zhurbenko 93196* (LE 260112). – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9359* (LE); 27.vi.1993, *Zhurbenko 93149b* (LE 260202b), *Zhurbenko 93113* (LE 260091). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 22.viii.1995, *Zhurbenko 95422* (LE 233468). Ragozinka River, 3.vii.1990, *Zhurbenko 90513* (LE 260192). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98317* (LE 233291). – **CHUKOTKA AUTONOMOUS AREA.** Baran'e Lake, 21.vii.1980, *Makarova s.n.* (LE 233408). Bezymiannoe Lake, 7.vii.1979, *Makarova s.n.* (LE 233609). Ėnmyvaam River, 30.vi.1980, *Makarova s.n.* (LE 233679). Lorino settlement, 6.vii.1972, *Makarova s.n.* (LE 233579).

REPORTS. – Zhurbenko (2002b, 2009b).

***Sphaerellothecium siphulae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (13). Medium-active. On *Siphula ceratites* (thallus). Pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 24.viii.1997, *Zhurbenko 97399* (LE 264310). Olenka River mouth, 5.ix.1997, *Zhurbenko 97398* (GZU, isotype; LE 264400, holotype). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 961031* (LE 261342). Cape Antseva, 7.viii.1997, *Matveeva s.n.* (LE 264430); 23.vii.2000, *Matveeva s.n.* (LE 264300); 16.viii.2000, *Matveeva s.n.* (LE 261273). Cape Baranova, 9.vii.1996, *Zhurbenko 961* (LE 261223). – TAYMYR PENINSULA. Krasnoe Lake, 18.viii.1995, *Zhurbenko 95591* (LE 261471). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 30.vii.1975, *Makarova s.n.* (LE 261272); 4.viii.1975, *Makarova s.n.* (LE 261472). Pepenveem River, 1.vii.1970, *Makarova s.n.* (LE 261322). Cape Schmidta, 1981, *Laanetu s.n.* (TU-56799). – WRANGEL ISLAND. Klark River, 1986, *Dobrysh s.n.* (LE 261293).

REPORTS. – Motiejūnaitė et al. (2019), Zhurbenko (2015).

***Sphaerellothecium soechtingii* Zhurb. & Alstrup**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On *Arthrorhaphis alpina* (thallus). Weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 30.vii.1995, *Zhurbenko 95231a* (LE 210493a, holotype). – **CHUKOTKA AUTONOMOUS AREA.** Televeem River, 23.vii.1979, *Makarova s.n.* (LE 210384).

REPORT. – Zhurbenko (2007c).

***Sphaerellothecium stereocaulorum* Zhurb. & Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On *Stereocaulon depressum* (thallus: naked portions of pseudopodetia). Weak pathogen.

VOUCHERS. – **REPUBLIC OF SAKHA (YAKUTIA).** Chaĭ-Tumus cabin, 6.viii.1998, *Zhurbenko 98241* (LE 210335). Tiksi settlement, 17.vii.1998, *Zhurbenko 9840* (LE 210364); 18.vii.1998, *Zhurbenko 98238* (LE 210315).

REPORT. – Zhurbenko & Triebel (2008).

***Sphaerellothecium taimyricum* (Zhurb.) Zhurb.**

(≡ *Sphaerellothecium thamnoliae* Zhurb. var. *taimyricum* Zhurb.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (13). Medium-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* (mostly) and *T. vermicularis* var. *vermicularis*. Weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 24.vii.1930, *Savicz 477* (LE 207535); 29.vii.1930, *Demme s.n.* (LE 207536, 207545a); 3.viii.1930, *Savicz s.n.* (LE 207546). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. Srednii Island, 25.viii.1930, 1930, *Savicz 2017a* (LE 207531a). – BOL'SHEVIK ISLAND, Akhmatova Bay, 16.vii.1996, *Zhurbenko 96913* (LE 232894). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Cape Nekrasova, 17.viii.2007, *Gavrilo s.n.* (LE 260418). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 24 vii 1995, *Zhurbenko 95585* (LE 260328); 20.viii.1995, *Zhurbenko 95586* (LE 260438, holotype). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95589* (LE 260568). Uboĭnaia River mouth, 2.viii.1990, *Zhurbenko 90752* (LE 260503). – **REPUBLIC OF SAKHA (YAKUTIA).** NEW SIBERIAN ISLANDS. Zhokhova Island, 1989,

Samarskii s.n. (LE 232974). – **CHUKOTKA AUTONOMOUS AREA.** Iskaten' Ridge, 4.vii.1971, *Makarova s.n.* (LE 260578). – WRANGEL ISLAND. Neozhidannaia River, 18.viii.1992, *Kholod s.n.* (LE 260488).

REPORT. – Zhurbenko (2012); see also *Stigmidium frigidum* in Erroneous and Doubtful Records.

***Sphaerellothecium thamnoliae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (21). Medium-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* (mostly) and *T. vermicularis* var. *vermicularis*. Weak pathogen.

VOUCHERS. – **MURMANSK REGION.** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 97397* (LE 260398). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 2.viii.1930, *Savicz 9e* (LE 207540); 3.viii.1930, *Savicz s.n.* (LE 207544). – **KRASNOYARSK TERRITORY.** Sibiriakova Island, 17.vii.1989, *Kuvaev s.n.* (LE 260558). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 24.viii.1994, *Zhurbenko 94373a* (LE 207477a), *Zhurbenko* 94395a (LE 207532a); 29.vii.1994, *Zhurbenko 94106* (LE 207543); 29.viii.1994, *Zhurbenko 9423* (LE 207541). West of Levinson-Lessinga Lake, 22.viii.1994, *Zhurbenko 94375* (LE 207537), *Zhurbenko 94376* (207539); 27.viii.1995, *Zhurbenko 95588* (LE 260428). Syrutaturku Lake, 17.viii.1994, *Pospelova s.n.* (LE 207538). – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 98410* (LE 260378). Tiksi settlement, 18.vii.1998, *Zhurbenko 98281* (LE 232964); *Zhurbenko 98404b* (LE 260344b). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 22.vi.1971, *Makarova s.n.* (LE 232944b, LE 260599). IAnrakynnot settlement, 1976, *Sytin s.n.* (LE 260408). – WRANGEL ISLAND. Klark River, 14.ix.1998, *Kholod s.n.* (LE 260508). Neizvestnaia River at its headwaters, 8.viii.1987, *Kholod s.n.* (LE 260548); 22.viii.1987, *Kholod s.n.* (LE 210405).

REPORT. – Zhurbenko (2012); see also *Stigmidium frigidum* in Erroneous and Doubtful Records.

***Sphaeropezia japewiae* (Zhurb. & Diederich) Baloch & Wedin**

(≡ *Odontotrema japewiae* Zhurb. & Diederich)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Japewia tornoënsis* (apothecia, prothallus, and thallus). Commensal or weak pathogen.

VOUCHER. – **MURMANSK REGION.** Porchnikha Bay, 7.ix.1997, *Zhurbenko 97355* (LE 261623, holotype).

REPORT. – Zhurbenko (2009b).

***Sphaeropezia santessonii* (Zhurb., Etayo & Diederich) Baloch & Wedin**

(≡ *Odontotrema santessonii* Zhurb., Etayo & Diederich)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (12). Medium-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* and *T. vermicularis* var. *vermicularis*. Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 1930, *Demme s.n.* (UPS). – **KRASNOYARSK TERRITORY.** Sverdrupa Island, 1.viii.1992, *Kozhevnikov s.n.* (UPS). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96148* (LE 232853). – TAYMYR PENINSULA. Krasnoe Lake, 15.viii.1995, *Zhurbenko 95309* (LE 232814). North of Levinson-Lessinga Lake, 24.viii.1994, *Zhurbenko 94373b* (LE 207477b). – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 98403* (LE 260364). Tiksi settlement, 17.vii.1998, *Zhurbenko 98279* (LE 232854), *Zhurbenko 98408* (LE 260324); 24.viii.1998, *Zhurbenko 98406* (LE 260524). – **CHUKOTKA AUTONOMOUS AREA.** Chegitun' River at its confluence with the Vetgyvaam River, 12.viii.1991, *Yurtsev s.n.* (LE 207696, holotype; hb. Diederich, isotype). Gil'mymlineĭveem River, 19.vii.1977, *Makarova s.n.* (LE 233094). – WRANGEL ISLAND. Neizvestnaia River at its headwaters, 9.viii.1987, *Kholod s.n.* (LE 232962).

REPORTS. – Diederich et al. (2002), Zhurbenko (2012).

***Sphaeropezia thamnoliae* (Zhurb., Diederich & Etayo) Baloch & Wedin**

(≡ *Odontotrema thamnoliae* Zhurb., Diederich & Etayo)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (8). Low-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* and *T. vermicularis* var. *vermicularis*. Commensal.

VOUCHERS. – **MURMANSK REGION** Voron'ia River mouth, 30.viii.1997, *Zhurbenko 9777* (LE 207714), *Zhurbenko 97392* (LE 260464). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96132* (LE 207716). – TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95584* (LE 260597). Piasina River mouth, vii.1993, *Kuvaev s.n.* (UPS). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 18.vii.1998, *Zhurbenko 98282* (LE 233074). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 21.vi.1971, *Makarova s.n.* (LE 207695, holotype). Koliuchinskaia Bay, 30.vii.1980, *Katenin* & *Zhurbenko s.n.* (LE 232864).

REPORTS. – Diederich et al. (2002), Zhurbenko (2012).

***Spirographa fusisporella* (Nyl.) Zahlbr.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On apothecium discs of *Melanohalea septentrionalis*. Weak pathogen.

VOUCHER. – **MURMANSK REGION.** 15 km N of Tumannyĭ settlement, 19.viii.1997, *Zhurbenko 97342* (LE 233249).

REPORT. – Zhurbenko (2009a).

***Stigmidium beringicum* Zhurb. & Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Stereocaulon alpinum* (thallus: phyllocladia). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Taniurer River, 5.ix.1943, *Avramchik s.n.* (LE 207665).

REPORT. – Zhurbenko & Triebel (2008).

***Stigmidium cerinae* Cl. Roux & Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (8). Low-active. On *Caloplaca cerina* (apothecium discs). Pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96719* (LE 260133). – TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94172* (LE 207512). Krasnoe Lake, 17.viii.1995, *Zhurbenko 95331* (LE 232812). East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95329* (LE 233072). North of Levinson-Lessinga Lake, 24.vii.1995, *Zhurbenko 95332* (LE 233002); 20.viii.1995, *Zhurbenko 95328* (LE 233082); 26.viii.1995, *Zhurbenko 95330* (LE 233052). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 24.viii.1998, *Zhurbenko 98286* (LE 232902).

REPORTS. – Zhurbenko (2009a, 2009b), Zhurbenko & Santesson (1996).

***Stigmidium cladoniicola* Zhurb. & Diederich**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Low-active. On thalli of *Cladonia coccifera*, *C. metacorallifera*, and *C. squamosa*. Weak pathogen or saprobe.

VOUCHERS – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97417* (LE 308915). Olenka River mouth, 5.ix.1997, *Zhurbenko 97406b* (LE 308893), *Zhurbenko 97410a* (LE 308906). – **NENETS AUTONOMOUS AREA.** Peschanka River, 21.viii.1998, *O. V. Lavrinenko s.n.* (LE 308934a). – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 28.viii.1995, *Zhurbenko 95602* (LE 308936).

REPORT. – Zhurbenko & Pino-Bodas (2017).

***Stigmidium collematis* Cl. Roux & Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Enchylium polycarpon* (apothecia). Commensal or pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Krasnyĭ Flag River, 14.vii.1997, *Kholod s.n.* (LE 232568).

REPORT. – Zhurbenko (2008).

***Stigmidium congestum* (Körb.) Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Rinodina roscida* (apothecia). Commensal or pathogen.

VOUCHER. – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Ledianaia Gavan' Bay, 28.viii.1995, *Kuliev s.n.* (LE 232150a).

REPORT. – Zhurbenko (2008).

***Stigmidium conspurcans* (Th. Fr.) Triebel & R. Sant.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (39). Medium-active. On *Psora rubiformis* (thallus). Commensal.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 23.vii.1930, *Savicz 1400b* (GZU, LE 207529b, UPS); 24.vii.1930, *Savicz 456c* (LE 207516), *Savicz 1434a* (LE 207522a), *Savicz 1446* (LE 207530). – NOVAYA ZEMLYA. Mashigina Bay, 1921, *Lynge s.n.* (O). – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. South of Aian Lake, 17.viii.1984, *Zhurbenko 84240* (LE 207526); 24.viii.1984, *Zhurbenko 84217b* (LE 207525b); 15.ix.1984, *Zhurbenko 84172* (LE 207514). Kapchuk Lake, 3.viii.1983, *Zhurbenko 83180* (LE 207517). – TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94172* (LE 207512), *Zhurbenko 94176* (LE 207521), *Zhurbenko 94204* (LE 207520), *Zhurbenko 94205* (LE 207515); 12.viii.1994, *Zhurbenko 94301* (C), *Zhurbenko 94302* (GZU). Krasnoe Lake, 16.viii.1995, *Zhurbenko 95299* (LE 232995); 17.viii.1995, *Zhurbenko 95298* (LE 233025). North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9450* (LE 207527), *Zhurbenko 9451* (LE 207519, UPS); 29.vii.1994, *Zhurbenko 94125* (LE 207524); 24.viii.1994, *Zhurbenko 94391* (LE 207523); 25.viii.1994, *Zhurbenko 94489* (LE 207518); 29.viii.1994, *Zhurbenko 9420* (LE 207528); 25.vii.1995, *Zhurbenko 95304* (LE 232965); 6.viii.1995, *Zhurbenko 95301* (LE 233075); 26.viii.1995, *Zhurbenko 95305* (LE 232895). South of Levinson-Lessinga Lake, 29.vii.1995, *Zhurbenko 95302* (LE 232875); 30.vii.1995, *Zhurbenko 95295b* (LE 232936b); 28.viii.1995, *Zhurbenko 95294b* (LE 232946b), *Zhurbenko 95405* (LE 233035). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95300* (LE 233055). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90561a* (LE 260173a). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 24.viii.1998, *Zhurbenko 98277* (LE 232985). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 6.viii.1979, *Makarova s.n.* (LE 233005); 15.viii.1979, *Makarova s.n.* (LE 233085). Inakhpak settlement, 28.viii.2001, *Zhurbenko 01152* (LE 233345). Iskaten' Ridge, 7.vii.1971, *Makarova s.n.* (LE 232975). Televeem River, 23.vii.1979, *Makarova s.n.* (LE 233045). WRANGEL ISLAND. Cape Ptichiĭ Bazar, 11.vii.2020, *Evdokimov 14* (LE-L15493).

REPORTS. – Evdokimov et al. (2022), Keissler (1928), Zhurbenko (2009a, 2009b), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Stigmidium croceae* (Arnold) Cl. Roux & Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On thalli of *Solorina bispora*, *S. crocea*, and *S. saccata*. Weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96894* (LE 232917). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96970* (LE 233822). – **CHUKOTKA AUTONOMOUS AREA.** Chegitun' River at its confluence with the Vetgyvaam River, 10.viii.1991, *Makarova s.n.* (LE 233992).

REPORTS. – Zhurbenko (2009a, 2009b).

***Stigmidium eucline* (Nyl.) Vězda**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Very rare (1). Low-active. On *Varicellaria lactea* (thallus). Possibly a commensal, gall-former.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 22.viii.1995, *Zhurbenko 95282* (LE 233037).

REPORT. – Zhurbenko (2009a).

***Stigmidium frigidum* (Sacc.) Alstrup & D. Hawksw.**

CHARACTERIZATION. – Extensive infections are visible to the naked eye. Infrequent (22). Medium-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* and *T. vermicularis* var. *vermicularis*. Weak pathogen, occasional gall-former (host thallus becomes bent, twisted and/or somewhat swollen).

VOUCHERS. – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko 90500* (LE 260353). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Mikoiana Bay, 21.vii.1996, *Zhurbenko 96917* (LE 232943). TAYMYR PENINSULA. Krasnoe Lake, 16.viii.1995, *Zhurbenko 95306a* (LE 232994a). East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95312* (LE 232823). North of

Levinson-Lessinga Lake, 24.vii.1995, *Zhurbenko 95310* (LE 232984), *Zhurbenko 95578* (LE 260354); 20.viii.1995, *Zhurbenko 95313* (LE 232863); 26.viii.1995, *Zhurbenko 95572* (LE 260523), *Zhurbenko 95573* (LE 260334). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95575* (LE 260564). West of Levinson-Lessinga Lake, 22.viii.1994, *Zhurbenko 94365* (LE 207533), *Zhurbenko 94375a* (LE 207537a), *Zhurbenko 94376* (LE 207539), *Zhurbenko 94377* (LE 207612); 27.viii.1995, *Zhurbenko 95300* (LE 233055), *Zhurbenko 95311* (LE 232923). Ragozinka River, 20.vii.1990, *Zhurbenko 90750* (LE 260413). – **REPUBLIC OF SAKHA (YAKUTIA).** Belaia Strelka Ridge, 31.viii.1975, *Egorova s.n.* (LE 260454). Tiksi settlement, 17.vii.1998, *Zhurbenko 98407a* (LE 260444a); 24.viii.1998, *Zhurbenko 98405* (LE 260484). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 22.vi.1971, *Makarova s.n.* (LE 233084). Gil'mymlineĭveem River, 19.vii.1977, *Makarova s.n.* (LE 232953).

REPORTS. – Zhurbenko (2012), Zhurbenko & Santesson (1996).

***Stigmidium gyrophorarum* (Arnold) D. Hawksw.**

(≡ *Endococcus gyrophorarum* (Arnold) J.C. David & D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On *Umbilicaria decussata* (thallus). Commensal or weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 94105a* (LE 207234a); 29.viii.1994, *Zhurbenko 9425* (LE 207233).

REPORT. – Zhurbenko & Santesson (1996).

***Stigmidium haesitans* (Nyl.) Diederich**

(≡ *Verrucaria haesitans* Nyl.)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Protothelenella sphinctrinoides* (thallus). Commensal.

VOUCHER. – **MURMANSK REGION.** Cape Orlov, c. 1891, *Kihlman s.n.* (H, isotype; S, holotype).

REPORTS. – Kihlman (1891), Zhurbenko (2001).

***Stigmidium leprariae* Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Lepraria neglecta* (thallus). Commensal.

VOUCHER. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97346* (LE 233348).

REPORT. – Zhurbenko (2009a).

***Stigmidium microcarpum* Alstrup & J.C. David**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (9). Low-active. On thalli, rarely apothecia, of *Flavocetraria cucullata*, and *Vulpicida juniperina* (including *V. tilesii*). Pathogen.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9363* (LE 233048). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95278* (LE 233028); 20.viii.1995, *Zhurbenko 95280* (LE 232938); 22.viii.1995, *Zhurbenko 95279* (LE 233008). – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 9866* (LE 233058). Tit-Ary Island, 20.viii.1998, *Zhurbenko 9857* (GZU, LE 232918), *Zhurbenko 9858* (LE 308955). YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 9863* (LE 232928). – **CHUKOTKA AUTONOMOUS AREA.** Vesnovannaia River, 11.viii.1980, *Makarova s.n.* (LE 232988).

REPORTS. – Zhurbenko (2002a, 2002b, 2009a).

***Stigmidium mitchellii* Cl. Roux & Bricaud**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (16). Medium-active. On apothecium discs and thalli of *Protopannaria pezizoides* and *Psoroma hypnorum*. Pathogen.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97373* (LE 260298b). Olenki River mouth, 7.ix.1997, *Zhurbenko 97376* (LE 260195). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96997* (LE 260086). Cape Antseva, 1.viii.1997, *Matveeva s.n.* (LE 260186); 12.viii.1997, *Matveeva s.n.*

(LE 260098); 21.viii.1998, *Matveeva s.n.* (LE 260096); 28.vii.2000, *Matveeva s.n.* (LE 260078); 31.vii.2000, *Matveeva s.n.* (LE 260235); 17.viii.2000, *Matveeva s.n.* (LE 260288). Cape Baranova, 10.vii.1996, *Zhurbenko 96992a* (LE 260177a); 12.vii.1996, *Zhurbenko 96994b* (LE 260227b); 14.vii.1996, *Zhurbenko 96991* (LE 260138). – TAYMYR PENINSULA. Uboĭnaia River mouth, 11.viii.1990, *Zhurbenko 90724* (LE 260127). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98384* (LE 260178). – **CHUKOTKA AUTONOMOUS AREA.** Lavrentiia settlement, 24.viii.1975, *Makarova s.n.* (LE 260036). – WRANGEL ISLAND. Tundrovaia River in its middle reaches, 22.viii.1995, *Kholod s.n.* (LE 260255).

REPORT. – Zhurbenko (2009b).

***Stigmidium mycobilimbiae* Cl. Roux, Triebel & Etayo**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On *Bilimbia lobulata* (thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96927* (LE 233296). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96130* (LE 207717). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 24.vii.1995, *Zhurbenko 95370* (LE 233357). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95369* (LE 233326).

REPORT. – Zhurbenko (2009a).

***Stigmidium peltideae* (Vain.) R. Sant. s. lat.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (49). Medium-active. On thalli, occasionally apothecia and cephalodia, of *Peltigera aphthosa*, *P. canina*, *P. continentalis*, *P. didactyla*, *P. elisabethae*, *P. leucophlebia*, *P. polydactylon*, *P. rufescens*, and *P. venosa*. Weak pathogen or facultative saprobe.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 24.vii.1930, *Savicz 1454* (LE 207558); 26.vii.1930, *Savicz 1408* (LE 207556). Northbrook Island, 28.vii.1930, *Savicz 1722* (UPS), *Savicz 1748* (LE 207555), *Savicz 1989* (LE 207557). Scott Kelty Island, 25.vii.1930, *Savicz 931* (LE 207551, 207554). – **KRASNOYARSK TERRITORY.** Leskino settlement, 15.viii.1972, *YUnak & Prokop'eva s.n.* (LE 233931). Troĭnoĭ Island, 17.vii.1992, *Kozhevnikov s.n.* (LE 233721). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 15.vii.1996, *Zhurbenko 96977* (LE 233831); 16.vii.1996, *Zhurbenko 96955a* (LE 233794a); 17.vii.1996, *Zhurbenko 96974* (LE 233951); 18.vii.1996, *Zhurbenko 96972* (LE 233771), *Zhurbenko 96328a* (LE 233841a). Cape Antseva, 28.vii.2000, *Matveeva s.n.* (LE 210326). Cape Baranova, 10.vii.1996, *Zhurbenko 96981* (LE 260230); 12.vii.1996, *Zhurbenko 96979* (LE 260099); 13.vii.1996, *Zhurbenko 96978* (LE 233781), *Zhurbenko 96983* (LE 260109); 14.vii.1996, *Zhurbenko 96982* (LE 260049). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96485a* (LE 260089a), *Zhurbenko 96984* (LE 260139). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1994, *Zhurbenko 94306* (LE 207552). North of Levinson-Lessinga Lake, 23.viii.1994, *Zhurbenko 94370* (LE 207559); 29.viii.1994, *Zhurbenko 9419* (LE 207550); 20.vii.1995, *Zhurbenko 95499* (LE 260219); 22.vii.1995, *Zhurbenko 95485* (LE 233991); 6.viii.1995, *Zhurbenko 95497* (LE 260029); 20.viii.1995, *Zhurbenko 95498* (LE 260079); 24.viii.1995, *Zhurbenko 95489a* (LE 233981a). South of Levinson-Lessinga Lake, 28.vii.1995, *Zhurbenko 95487* (LE 233911). Piasina River mouth, vii.1993, *Kuvaev s.n.* (LE 206929b, LE 206934b). North-west of Piasino Lake, 16.vii.1983, *Zhurbenko 8370* (LE 207549). – **REPUBLIC OF SAKHA (YAKUTIA).** Ambarchik settlement, 15.viii.2002, *Walker s.n.* (LE). Kurungnaakh-Sise Island, 1.viii.1998, *Zhurbenko 98363* (LE 233862); 8.viii.1998, *Zhurbenko 98362* (LE 233701), *Zhurbenko 98364* (LE 260059). Samoĭlovskiĭ Island, 27.vii.1998, *Zhurbenko 98353* (LE 233962). Tiksi settlement, 17.vii.1998, *Zhurbenko 98365* (LE 260050); 24.viii.1998, *Zhurbenko 98348a* (LE 233874a). – **CHUKOTKA AUTONOMOUS AREA.** Amguema River, 17.viii.1979, *Makarova s.n.* (LE 260169). Baran'e Lake, 24.vii.1980, *Makarova s.n.* (LE 260300). Chegitun' River at its confluence with the Khesmymken River, 21.viii.1982, *Katenin s.n.* (LE 260200). Inchoun settlement, 2.viii.1975, *Makarova s.n.* (LE 233821). Ioni Lake, 7.vii.1977, *Makarova s.n.* (LE 233871). Kurupka River, 29.vii.1987, *Katenin s.n.* (LE 233961). Loren River, 13.viii.1972, *Makarova s.n.* (LE 260239). Uelen settlement, 9.viii.1975, *Makarova s.n.* (LE).

REPORTS. – Karatygin et al. (1999), Zhurbenko (1998, 2009b), Zhurbenko & Santesson (1996), Zhurbenko et al. (2005).

***Stigmidium pseudopeltideae* Cl. Roux & Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (5). Low-active. On thalli of *Peltigera canina*, *P. degenii*, *P. elisabethae*, and *P. rufescens*. Weak pathogen or facultative saprobe.

VOUCHERS. – **MURMANSK REGION.** Olenka River mouth, 7.ix.1997, *Zhurbenko 97369* (LE 233861). – **KRASNOYARSK TERRITORY.** Sverdrupa Island, 1992, *Kozhevnikov s.n.* (LE 233881). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Baranova Cape, 20.vii.1996, *Zhurbenko 96987* (LE 260199), *Zhurbenko 96988* (LE 260259). – **CHUKOTKA AUTONOMOUS AREA.** Kurupka River, 8.viii.1987, *Katenin s.n.* (LE 260040).

REPORT. – Zhurbenko (2009b).

***Stigmidium rivulorum* (Kernst.) Cl. Roux & Nav.-Ros.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Verrucaria* sp. (thallus). Possibly a weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 15.vii.1985, *Zhurbenko 8558* (LE 207560).

REPORT. – Zhurbenko & Hafellner (1999).

***Stigmidium schaereri* (A. Massal.) Trevis. s. str.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (6). Low-active. On *Dacampia hookeri* (thallus). Weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94173b* (LE 207077b). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95286* (LE 233036). – **REPUBLIC OF SAKHA (YAKUTIA).** YUryung-Kysam Tract, 19.viii.1998, *Zhurbenko 98310* (LE 233272). – **CHUKOTKA AUTONOMOUS AREA.** Inchoun settlement, 4.viii.1975, *Makarova s.n.* (LE 233151a). Iskaten' Ridge, 26.vii.1971, *Makarova s.n.* (LE 232806a). – WRANGEL ISLAND. Gusinaia River, 2.viii.1991, *Kholod s.n.* (LE 260234).

REPORTS. – Karatygin et al. (1999), Zhurbenko (2009a, 2009b), Zhurbenko & Santesson (1996).

***Stigmidium solorinarium* (Vain.) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Infrequent (15). Medium-active. On thalli, occasionally apothecium discs, of *Solorina bispora* var. *bispora*, *S. bispora* var. *subspongiosa*, and *S. saccata*. Weak pathogen or facultative saprobe.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Ziegler Island, 25.vii.2019, *Konoreva 151* (LE F-350211). – **NENETS AUTONOMOUS AREA.** Seduiakha River, 3.viii.1998, *O. V. Lavrinenko s.n.* (LE 233772). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 96968* (LE 233732), *Zhurbenko 96976b* (LE 233891b). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 25.viii.1994, *Zhurbenko 94453b* (LE 207562b); 20.viii.1995, *Zhurbenko 95476b* (LE 233893b); 25.viii.1995, *Zhurbenko 95477a* (LE 233863a). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 14.viii.1987, *Perfil'eva s.n.* (LE 233852). Samoĭlovskiĭ Island, 12.vii.1988, *Makarova s.n.* (LE 260117b). – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 18.vii.1977, *Makarova s.n.* (LE 233932). Inchoun settlement, 7.viii.1975, *Makarova s.n.* (LE 309009); 9.viii.1975, *Makarova s.n.* (LE 260280). Lavrentiia settlement, 10.vii.1973, *Makarova s.n.* (LE 233892); 16.vii.1973, *Makarova s.n.* (LE 233832). Sireniki settlement, 17.vii.1983, *Makarova s.n.* (LE 233982).

REPORTS. – Chesnokov & Konoreva (2023), Karatygin et al. (1999), Zhurbenko (2009b), Zhurbenko & Santesson (1996).

***Stigmidium squamariae* (de Lesd.) Cl. Roux & Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On *Lecanora polytropa* (apothecium discs). Commensal or weak pathogen.

VOUCHERS. – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 11.vii.1979, *Makarova s.n.* (LE 261625). Karval'ianskaia River, 31.vii.1982, *Afonina s.n.* (LE 261533).

REPORT. – Zhurbenko (2009b).

***Stigmidium stereocaulorum* Zhurb. & Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (5). Low-active. On thalli of *Stereocaulon depressum*, *S. groenlandicum*, and *S. rivulorum*. Weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 2.viii.1930, *Savicz s.n.* (LE 207131); 16.viii.1979, *Safronova s.n.* (LE 207653). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 17.vii.1996, *Zhurbenko 9692* (LE 207662, holotype); 18.vii.1996, *Zhurbenko 96121* (M-0044834). – **CHUKOTKA AUTONOMOUS AREA.** WRANGEL ISLAND. Sovetskaia River, 22.viii.1991, *Shtrik s.n.* (LE 210302).

REPORT. – Zhurbenko & Triebel (2008).

***Stigmidium stygnospilum* (Minks) R. Sant.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On *Dermatocarpon miniatum* var. *complicatum* (thallus). Possibly a weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnoe Lake, 17.viii.1995, *Zhurbenko 95293* (LE 232826). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95291* (LE 232956).

REPORT. – Zhurbenko (2009a).

***Stigmidium superpositum* (Nyl.) D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (3). Low-active. On *Sporodictyon terrestre* (thallus). Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95403* (LE 233171); 24.vii.1995, *Zhurbenko 95402* (LE 233161). – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 20.vii.1977, *Makarova s.n.* (LE 233363).

REPORT. – Zhurbenko (2009a).

***Stigmidium tabacinae* (Arnold) Triebel**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Thalloidima sedifolium* (thallus). Commensal.

VOUCHER. – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 98275* (LE 232916).

REPORT. – Zhurbenko (2009a).

***Taeniolella arctoparmeliae* Heuchert & Zhurb.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Arctoparmelia separata* (thallus). Possibly a weak pathogen.

VOUCHER. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 31.vii.1995, *Zhurbenko 95385* (HAL 3139, holotype; LE 309437, isotype).

REPORT. – Heuchert et al. (2018).

***Taeniolella christiansenii* Alstrup & D. Hawksw.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Infrequent (19). Medium-active. On thalli (phyllocladia, occasionally pseudopodetia and soralia) of *Stereocaulon alpinum*, *S. botryosum*, *S. depressum*, *S. glareosum*, *S. groenlandicum*, *S. rivulorum*, *S. subcoralloides*, and *S. symphycheilum*. Commensal or weak pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** Dikson Island, 7.vii.1990, *Zhurbenko 901151* (LE 233749). – PUTORANA PLATEAU. South of Aian Lake, 16.viii.1984, *Zhurbenko 84313* (LE 233692). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Antseva, 19.vii.2000, *Matveeva s.n.* (LE 233486). Ostantsovaia River, 12.vii.1996, *Zhurbenko 96947b* (LE 233407b). Mount Ostraia, 11.vii.1996, *Zhurbenko 9678* (LE 343088). – OKTIABR'SKOĬ REVOLYUTSII ISLAND. Cape Massivnyĭ, 16.viii.2007, *Gavrilo s.n.* (LE 210370). – TAYMYR PENINSULA. Krasnoe Lake, 16.viii.1995, *Zhurbenko 95436* (LE 233521), *Zhurbenko 95437* (LE 233531). South of Levinson-Lessinga Lake, 28.viii.1995, *Zhurbenko 95438* (LE 233682). Osipovka River, 18.vii.1990, *Zhurbenko 90370a* (LE 207693a). Pravaia Uboĭnaia River, 5.viii.1990, *Zhurbenko 90896* (LE 233950). Ragozinka River, 2.vii.1990, *Zhurbenko 90835* (LE 233870). – **REPUBLIC OF SAKHA (YAKUTIA).** Tiksi settlement, 17.vii.1998, *Zhurbenko 9846a* (LE

233541a); 24.viii.1998, *Zhurbenko 9828* (LE 233551), *Zhurbenko 98322a* (LE 233452a). – NEW SIBERIAN ISLANDS. Bennetta Island, 9.viii.1989, *Zhurbenko 8972* (LE 207677). – **CHUKOTKA AUTONOMOUS AREA.** Baran'e Lake, 22.vii.1980, *Makarova s.n.* (LE 207580). Taniurer River, 5.ix.1943, *Avramchik s.n.* (LE 207579). – WRANGEL ISLAND. Gusinaia River, 24.vii.1991, *Kholod s.n.* (LE 233402).

REPORTS. – Heuchert et al. (2018), Karatygin et al. (1999), Zhurbenko (2010a).

***Taeniolella diederichiana* Etayo & Calatayud**

CHARACTERIZATION. – Readily visible under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Placopsis gelida* (thallus). Commensal or weak pathogen.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 18.vii.1977, *Makarova s.n.* (LE 233362).

REPORT. – Zhurbenko (2009a).

***Taeniolella diploschistis* Heuchert, U. Braun, Diederich & Zhurb.**

CHARACTERIZATION. – Extensive infections are visible under a hand lens (10×). Very rare (2). Low-active. On *Diploschistes scruposus* (thallus). Commensal or pathogen.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA North of Levinson-Lessinga Lake, 6.viii.1995, *Zhurbenko 95379* (LE 233295). – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 98417* (LE 310182).

REPORTS. – Heuchert et al. (2019), Zhurbenko (2021d).

***Taeniolella pertusariicola* D. Hawksw. & H. Mayrhofer**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On apothecia, occasionally thalli of *Pertusaria bryontha* and *P. carneopallida*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North-west of Piasino Lake, 18.vii.1983, *Zhurbenko 83127* (LE 207581). – **REPUBLIC OF SAKHA (YAKUTIA).** Ambarchik settlement, 15.viii.2002, *Walker s.n.* (LE 310269, LE 310270). Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98378* (LE 260038).

REPORTS. – Zhurbenko (1998, 2009b), Zhurbenko et al. (2005).

***Taeniolella rolfii* Diederich & Zhurb.**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (8). Medium-active. On thalli of *Cetraria aculeata*, *C. islandica*, *C. muricata*, *C. nigricans*, *C. odontella* and *Cetrariella delisei*. Commensal, gall-former.

VOUCHERS. – **MURMANSK REGION.** 15 km N of Tumannyĭ settlement, 10.ix.1997, *Zhurbenko 9728* (LE 207584). – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Gusinaia Zemlia Peninsula, 1921, *Lynge s.n.* (O; as *Cetraria capitata*); Matochkin Shar Strait, 1921, *Lynge s.n.* (O; as *Cetraria capitata*). – **NENETS AUTONOMOUS AREA.** Peschanka River, 5.vii.1997, *O. V. Lavrinenko s.n.* (LE 210245). – **KRASNOYARSK TERRITORY.** Geiberg Islands, viii.1951, *Musina s.n.* (herb. Diederich, isotype; LE 207586, holotype). Troĭnoĭ Island, 10.vii.1992, *Kozhevnikov s.n.* (herb. Diederich, LE 207585). – SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Cape Baranova, 14.vii.1996, *Zhurbenko 96342* (LE 210242). – **REPUBLIC OF SAKHA (YAKUTIA).** Stolb Island, 12.viii.1998, *Zhurbenko 9873* (LE 309016).

REPORTS. – Diederich & Zhurbenko (1997, 2001), Heuchert et al. (2018), Lynge (1928), Zhurbenko (2001).

***Talpapellis beschiana* (Diederich) Zhurb., U. Braun, Diederich & Heuchert**

(= *Ameroconium cladoniae* U. Braun & Zhurb.; ≡ *Taeniolella beschiana* Diederich)

CHARACTERIZATION. – Extensive infections are visible under a hand lens (10×). Infrequent (15). Medium-active. On thalli of *Cladonia amaurocraea*, *C. bellidiflora*, *C. coccifera*, *C. pocillum*, *C. rangiferina*, *C. stricta*, and *C. symphycarpia*. Commensal.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97413* (LE 308910); 2.ix.1997, *Zhurbenko 97408* (LE 308899). – **ARKHANGELSK REGION.** FRANZ JOSEF LAND. Hooker Island, 2.viii.1930, *Savicz 6b* (C, GZU, LE 207577, UPS). – **NENETS AUTONOMOUS AREA.** Ortina River, 28.vi.1999, *O. V. Lavrinenko s.n.* (LE 308930). –

KRASNOYARSK TERRITORY. TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95595* (LE 308892). South of Levinson-Lessinga Lake, 1.viii.1995, *Zhurbenko 95213* (LE 309448); 28.viii.1995, *Zhurbenko 95601* (LE 308932). Piasina River mouth, 22.vii.1993, *Kuvaev 1968* (LE 308517). North-west of Piasino Lake, 24.vii.1983, *Zhurbenko 83143* (LE 207575). Uboĭnaia River mouth, 15.viii.1990, *Zhurbenko 901085b* (LE 308571b). – **CHUKOTKA AUTONOMOUS AREA.** 36th km Ėgvekinot-Iul'tin road, 14.vii.1971, *Makarova s.n.* (LE 308749). Iskaten' Ridge, 4.vii.1971, *Makarova s.n.* (LE 308829). Mount Pynei, 3.vi.1951, *Shmorunova s.n.* (LE 308810b). Sireniki settlement, 24.vii.1983, *Makarova s.n.* (LE 308835). – WRANGEL ISLAND. Mamontovaia River, 4.viii.1995, *Kholod s.n.* (LE 309012).

REPORTS. – Heuchert et al. (2018), Zhurbenko (1998), Zhurbenko & Alstrup (2004), Zhurbenko & Pino-Bodas (2017), Zhurbenko & Santesson (1996).

***Talpapellis peltigerae* Alstrup & M.S. Cole var. *rossica* Heuchert, Zhurb. & U. Braun**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On thalli, occasionally cephalodia, of *Peltigera aphthosa*, *P. leucophlebia*, and *P. venosa*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 22.viii.1995, *Zhurbenko 95491* (HAL 2652 F, isotype; LE 260992, holotype). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 14.viii.1987, *Perfil'eva s.n.* (LE 260972). – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 19.vii.1977, *Makarova s.n.* (LE 260962). Koliuchinskaia Bay, 27.viii.1980, *Katenin & Zhurbenko s.n.* (LE 260982).

REPORT. – Heuchert et al. (2014).

***Tetramelas phaeophysciae* A. Nordin & Tibell**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (6). Low-active. On thalli of *Phaeophyscia sciastra* and *Physia caesia*. Commensal or sometimes weak pathogen.

VOUCHERS. – **YAMAL-NENETS AUTONOMOUS AREA.** Mount Rai-Iz, 26.vi.1993, *Zhurbenko 9357* (LE 260032); 27.vi.1993, *Zhurbenko 93144* (LE 260232). – **KRASNOYARSK TERRITORY.** PUTORANA PLATEAU. Kapchuk Lake, 2.viii.1982, *Titov s.n.* (LE 206967). – TAYMYR PENINSULA. Bol'shaia Bootankaga River, 10.vii.1991, *Kuvaev s.n.* (LE 260121). South of Levinson-Lessinga Lake, 31.vii.1995, *Zhurbenko 95421* (LE 233251). Ragozinka River, 3.vii.1990, *Zhurbenko 90515*a (LE 260081a).

REPORT. – Zhurbenko (2009b); see also *Buellia pulverulenta* in Erroneous and Doubtful Records.

***Tetramelas pulverulentus* (Anzi) A. Nordin & Tibell**

(≡ *Leciographa muscigenae* (Anzi) Rehm)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Frequent (34). Medium-active. On thalli of *Anaphychia ciliaris*, *Physcia caesia*, *P. dubia*, and *Physconia muscigena* (mostly). Commensal or sometimes weak pathogen.

VOUCHERS. – **ARKHANGELSK REGION.** NOVAYA ZEMLYA. Matochkin Shar Strait, 1921, *Lynge s.n.* (herbarium unknown). Russkaia Gavan' Bay, 19.vi.1997, *Shevchenko s.n.* (LE 233261). – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. Akhmatova Bay, 16.vii.1996, *Zhurbenko 96945* (LE 233231). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96946*b (LE 233489b). Studënaia River, 16.viii.1998, *Matveeva s.n.* (LE 233321). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1995, *Zhurbenko 95414* (LE 233619). Krasnoe Lake, 15.viii.1995, *Zhurbenko 95407* (LE 233241), *Zhurbenko 95415* (LE 233599); 17.viii.1995, *Zhurbenko 95409*a (LE 233549a). East of Levinson-Lessinga Lake, 9.viii.1995, *Zhurbenko 95413* (LE 233311). North of Levinson-Lessinga Lake, 29.vii.1994, *Zhurbenko 9493a* (LE 206969a), *Zhurbenko 94139* (LE 206968); 3.viii.1994, *Zhurbenko* 94257 (LE 206970); 22.vii.1995, *Zhurbenko 95406* (LE 233301); 6.viii.1995, *Zhurbenko 95410*a (LE 233351); 20.viii.1995, *Zhurbenko 95530* (LE 261538); 22.viii.1995, *Zhurbenko 95418* (LE 233639), *Zhurbenko 95420* (LE 233669); 26.viii.1995, *Zhurbenko 95408* (LE 233271). South of Levinson-Lessinga Lake, 31.vii.1995, *Zhurbenko 95417* (LE 233649). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95416* (LE 233699). Osipovka River, 18.vii.1990, *Zhurbenko 90519*a (LE 260092a). Ragozinka River, 3.vii.1990, *Zhurbenko 90577* (LE 260182); 14.vii.1990, *Zhurbenko 90516* (LE 260191). – **REPUBLIC OF SAKHA (YAKUTIA).** Amerika-Khaia hill, 30.vii.1998, *Zhurbenko 98319* (LE 233589). Stolb Island, 12.viii.1998, *Zhurbenko 98315* (LE 233361). Tiksi settlement, 17.vii.1998, *Zhurbenko 98318* (LE 233281);

24.viii.1998, *Zhurbenko 98321* (LE 233519). – NEW SIBERIAN ISLANDS. Bel'kovskiĭ Island, 1994, *Mattsson 3181b* (UPS). – **CHUKOTKA AUTONOMOUS AREA.** Chegitun' River at its confluence with the Khesmymken River, 29.viii.1982, *Katenin s.n.* (LE 233221). Gil'mymlineĭveem River, 18.vii.1977, *Makarova s.n.* (LE 233211). Lavrentiia settlement, 21.vii.1973, *Makarova s.n.* (LE 233449). – WRANGEL ISLAND. Gusinaia River in its lower reaches, 19.viii.1991, *Kholod s.n.* (LE 210349). Komsomol Lake, 14.viii.1991, *Kholod s.n.* (LE 210379).

REPORTS. – Keissler (1928), Nordin (2000), Zhurbenko (2002b, 2008, 2009b), Zhurbenko & *Matveeva* (2006).

Thamnogalla crombiei **(Mudd) D. Hawksw.**

CHARACTERIZATION. – Quite visible to the naked eye. Infrequent (20). Medium-active. On thalli of *Thamnolia vermicularis* var. *subuliformis* and *T. vermicularis* var. *vermicularis*. Commensal, gall-former.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 21.viii.1997, *Zhurbenko 97387* (LE 260594). 15 km N of Tumannyĭ settlement, 10.ix.1997, *Zhurbenko 97389* (LE 260584). Voron'ia River mouth, 30.viii.1997, *Zhurbenko 97390* (LE 260534). – **NENETS AUTONOMOUS AREA.** Dolgiĭ Island, 21.viii.1998, *Shevchenko s.n.* (LE 232824). – **KRASNOYARSK TERRITORY. SEVERNAYA ZEMLYA.** BOL'SHEVIK ISLAND. Akhmatova Bay, 15.vii.1996, *Zhurbenko 961024* (LE 260314); 17.vii.1996, *Zhurbenko 96914* (LE 233064); 18.vii.1996, *Zhurbenko 961025* (LE 260514). Cape Baranova, 10.vii.1996, *Zhurbenko 96907* (LE 232834). Mikoiana Bay, 21.vii.1996, *Zhurbenko 96911* (LE 232904). – TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.vii.1995, *Zhurbenko 95577* (LE 260434). Ragozinka River, 25.vii.1990, *Zhurbenko 90787* (LE 260513). Uboĭnaia River mouth, 20.viii.1990, *Zhurbenko 90753* (LE 260463). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98280* (LE 233014). – **CHUKOTKA AUTONOMOUS AREA.** Baranikha settlement, 22.vi.1971, *Makarova s.n.* (LE 232944a). Chaplinskie hot springs, 7.viii.1957, *Gavriliuk & Gagarin s.n.* (LE 232843). – WRANGEL ISLAND. Gusinaia River, 21.viii.1991, *Shtrik s.n.* (LE 232982). Naskhok River, 22.viii.1998, *Kholod s.n.* (LE 232932). Neizvestnaia River at its headwaters, 12.viii.1987, *Kholod s.n.* (LE 210470). Neozhidannaia River, 19.viii.1992, *Kholod s.n.* (LE 260374b). Tundrovaia River in its lower reaches, 2.viii.1996, *Kholod s.n.* (LE 233004).

REPORTS. – Zhurbenko (2008, 2012).

Tremella christiansenii **Diederich**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Physcia dubia* (thallus). Commensal, gall-former.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Bezymiannoe Lake, 8.vii.1979, *Makarova s.n.* (LE 233578).

REPORT. – Zhurbenko (2009b).

Trichosphaeria lichenum **P. Karst. & Har.**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (2). Low-active. On thalli, including rhizines, occasionally cephalodia, of *Peltigera malacea* and *P. scabrosa*. Commensal or facultative saprobe.

VOUCHERS. – **MURMANSK REGION.** Dal'nie Zelentsy settlement, 22.viii.1997, *Zhurbenko 97365* (LE 233795). – **NENETS AUTONOMOUS AREA.** Khar'iaga oilfield, 22.vii.2007, *Zhurbenko 0731* (LE 210447).

REPORT. – Zhurbenko (2009b); see also *Raciborskiomyces peltigericola* in Erroneous and Doubtful Records.

Trimmatostroma varicellariae **Heuchert & U. Braun**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Varicellaria rhodocarpa* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** Polovinka, 15.ix.1876, *Brenner s.n.* (UPS).

REPORT. – Heuchert & Braun (2014).

***Unguiculariopsis refractiva* (Coppins) Coppins**

(≡ *Skyttea refractiva* Coppins)

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Very rare (1). Low-active. On *Bilimbia lobulata* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** SEVERNAYA ZEMLYA. BOL'SHEVIK ISLAND. 21.vii.1996, *Zhurbenko 96131* (LE 207715).

REPORT. – Diederich & Etayo (2000).

***Unguiculariopsis thallophila* (P. Karst.) W.Y. Zhuang**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Myriolecis hagenii* var. *fallax* (thallus). Commensal.

VOUCHER. – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 24.vii.1977, *Makarova s.n.* (LE 261737).

REPORT. – Zhurbenko (2009b).

***Weddellomyces protearius* Nav.-Ros. & Cl. Roux**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Rusavskia elegans* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY.** TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.viii.1995, *Zhurbenko 95526* (LE 261518).

REPORT. – Zhurbenko (2009b).

***Xenonectriella lutescens* (Arnold) Weese**

CHARACTERIZATION. – Readily visible only under a stereomicroscope (20–40×). Rare (4). Low-active. On apothecium discs and thalli of *Solorina bispora* var. *subspongiosa*, *S. saccata*, and *S. spongiosa*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. North of Levinson-Lessinga Lake, 20.viii.1995, *Zhurbenko 95501a* (LE 260299a). – **REPUBLIC OF SAKHA (YAKUTIA).** Samoĭlovskiĭ Island, 12.vii.1988, *Makarova s.n.* (LE 260290); 21.vii.1998, *Zhurbenko 98373* (LE 260189). Stolb Island, 12.viii.1998, *Zhurbenko 98376* (LE 260210).

REPORT. – Zhurbenko (2009b).

***Xenonectriella ornamentata* (D. Hawksw.) Rossman**

(≡ *Pronectria ornamentata* (D. Hawksw.) Lowen)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (6). Low-active. On thalli, including soralia, of *Peltigera didactyla*, *P. extenuata* and *P. rufescens*. Weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Severnaia River, 14.viii.1996, *O. V. Lavrinenko s.n.* (LE 233568). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Khatanga settlement, 4.ix.1995, *Zhurbenko 95448* (LE 233817). North of Levinson-Lessinga Lake, 22.vii.1995, *Zhurbenko 95423* (LE 233488). West of Levinson-Lessinga Lake, 27.viii.1995, *Zhurbenko 95451* (LE 233846). – **CHUKOTKA AUTONOMOUS AREA.** Koliuchinskaia Bay, 4.viii.1980, *Katenin* & *Zhurbenko s.n.* (LE 233927). Sireniki settlement, 17.vii.1986, *Katenin s.n.* (LE 233957).

REPORT. – Zhurbenko (2009b).

***Zwackhiomyces berengerianus* (Arnold) Grube & Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Rare (5). Low-active. On thalli of *Lecidea berengeriana* and *Mycobilimbia carneoalbida*. Commensal.

VOUCHERS. – **KRASNOYARSK TERRITORY**. PUTORANA PLATEAU. Kapchuk Lake, 3.viii.1983, *Zhurbenko 83151* (LE 207605), *Zhurbenko 8346* (LE 207604). – TAYMYR PENINSULA. Krasnaia River, 12.viii.1994, *Zhurbenko 94295* (LE 207606; as *Z. berengerianus* agg.). North of Levinson-Lessinga Lake, 27.vii.1994, *Zhurbenko 9452* (LE 207607; as *Z. berengerianus* agg.). – **REPUBLIC OF SAKHA (YAKUTIA).** Cape Krest-Tumsa, 4.viii.1998, *Zhurbenko 98309* (LE 233193).

REPORTS. – Zhurbenko (2009a), Zhurbenko & Hafellner (1999), Zhurbenko & Santesson (1996).

***Zwackhiomyces dispersus* (Körb.) Triebel & Grube**

(≡ *Stigmidium dispersum* (Körb.) D. Hawksw.)

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Protoblastenia terricola* (thallus). Commensal.

VOUCHER. – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. Krasnaia River, 10.viii.1994, *Zhurbenko 94189* (LE 207608).

REPORT. – Zhurbenko & Santesson (1996).

***Zwackhiomyces immersae* (Arnold) Grube & Triebel**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (1). Low-active. On *Bacidia bagliettoana* (thallus). Commensal.

VOUCHER. – **YAMAL-NENETS AUTONOMOUS AREA.** Belyĭ Island, 27.vii.2009, *Walker s.n.* (LE 261548).

REPORT. – Zhurbenko (2009b).

***Zwackhiomyces macrosporus* Alstrup & Olech**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On thalli of *Biatora subduplex* and *Protoblastenia terricola*. Commensal.

VOUCHERS. – **CHUKOTKA AUTONOMOUS AREA.** Gil'mymlineĭveem River, 23.vii.1977, *Makarova s.n.* (LE 233162). Sireniki settlement, 20.vii.1983, *Makarova s.n.* (LE 233173).

REPORT. – Zhurbenko (2009a).

***Zwackhiomyces physciicola* Alstrup**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Physcia caesia* (thallus). Commensal.

VOUCHERS. – **MURMANSK REGION.** Shel'pino Bay, 4.ix.1997, *Zhurbenko 97359* (LE 233559). – **CHUKOTKA AUTONOMOUS AREA.** Iskaten' Ridge, 5.vii.1971, *Makarova s.n.* (LE 233469).

REPORT. – Zhurbenko (2009b).

***Zwackhiomyces sphinctrinoides* (Zwackh) Grube & Hafellner**

CHARACTERIZATION. – Readily visible only under a hand lens (10×). Very rare (2). Low-active. On *Rusavskia elegans* (apothecia, thallus). Commensal or weak pathogen.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Bol'shoĭ TSinkovyĭ Island, 1997, *Shevchenko s.n.* (LE 261748a). – **KRASNOYARSK TERRITORY**. TAYMYR PENINSULA. South of Levinson-Lessinga Lake, 31.vii.1995, *Zhurbenko 95532a* (LE 261598a).

REPORTS. – Zhurbenko (2009b), Zhurbenko et al. (2012).

***Zyzygomyces bachmannii* (Diederich & M.S. Christ.) Diederich, Millanes & Wedin**

(≡ *Heterocephalacria bachmannii* (Diederich & M.S. Christ.) Millanes & Wedin; ≡ *Syzygospora bachmannii* Diederich & M.S. Christ.)

CHARACTERIZATION. – Quite visible to the naked eye. Rare (9). Low-active. On thalli of *Cladonia furcata*, *C. gracilis*, and *C. macroceras*. Commensal, gall-former.

VOUCHERS. – **NENETS AUTONOMOUS AREA.** Cape Bolvanskiĭ Nos, 20.vii.1999, *O. V. Lavrinenko s.n.* (LE 309193). Khar'iaga oilfield, 18.vii.2007, *Zhurbenko 0742* (LE 232154); 19.vii.2007, *Zhurbenko 0733* (distributed in Mycotheca Petropolitana (Morozova & Popov 2008)); 20.vii.2007, *Zhurbenko 0734* (LE 309312); 24.vii.2007, *Zhurbenko 0739*. – **CHUKOTKA AUTONOMOUS AREA.** Lorino settlement, 9.vii.1972, *Makarova s.n.* (LE 309199). Puoten settlement, 19.vii.1972, *Makarova s.n.* (LE 309203). Sireniki settlement, 18.vii.1984, *Katenin s.n.* (LE 309201), 23.vii.1986, *Katenin s.n.* (LE 309200).

REPORTS. – Morozova & Popov (2008), Zhurbenko (2008), Zhurbenko & Pino-Bodas (2017).

ERRONEOUS AND DOUBTFUL RECORDS

Abrothallus bertianus De Not.

NOTES. – Reported from Gydan Peninsula, growing on *Parmelia omphalodes* (Andreev 1994). Probably a misidentification of *Abrothallus parmeliarum*, since *A. bertianus* typically grows on *Melanelixia*, and possibly also on *Melanohalea* (Diederich et al. 2018, Suija et al. 2018b).

Arthonia glaucomaria Nyl.

NOTES. – Reported from the Polar Urals and Chukotka Autonomous Area without specifying collection sites, hosts, collectors, examined herbarium specimens or literature sources (Andreev et al. 1996). The report of this species from Chukotka Autonomous Area is probably based on a doubtful report of *Phacographa glaucomaria* (Nylander 1887) discussed below.

Buellia pulverulenta (Anzi) Jatta

NOTES. – Reported from the Polar Urals (based on LE 260032; Zhurbenko 2002b) and Putorana Plateau (based on LE 206967; Zhurbenko & Hafellner 1999). These records were subsequently revised in *Tetramelas phaeophysciae* (Zhurbenko 2009b).

Carbonea vitellinaria (Nyl.) Hertel

NOTES. – Reported from the Yana-Kolyma area without specifying collection sites, hosts, collectors, examined herbarium specimens or literature sources (Andreev et al. 1996).

Cercidospora thamnoliicola Ihlen

NOTES. – Reported from the Krasnoyarsk Territory (based on LE 207056, LE 210306; Zhurbenko 2008, Zhurbenko & Santesson 1996) and the Republic of Sakha (Yakutia) (based on LE 207223; Karatygin et al. 1999). These records were subsequently revised to *Cercidospora thamnoliae* (Zhurbenko 2012).

Dactylospora deminuta (Th. Fr.) Triebel

NOTES. – Reported from Gydan Peninsula, growing on *Ochrolechia* (Andreev 1994). The current name of this lichenicolous fungus is *Sclerococcum deminutum*. It grows on a variety of lichen genera and has occasionally been found on *Ochrolechia* (Zhurbenko 1998). However, other species of *Sclerococcum* are more common on *Ochrolechia* (Diederich et al. 2018), so this report needs to be verified.

Dactylospora rinodinicola Alstrup & D. Hawksw.

NOTES. – Reported from Franz Josef Land, growing on *Rinodina turfacea* (based on LE 309293; Zhurbenko & Santesson 1996). The record is revised here to *Sclerococcum deminutum*.

Dicoccum trachylioides (Deichm. Branth & Rostr.) Keissl.

NOTES. – Reported from Novaya Zemlya, growing on *Buellia* sp., in the section on imperfect fungi in Keissler (1928) with the comment that the sample may represent a juvenile, only 2-celled stage of *Sclerococcum sphaerale* Fr. The taxonomic status of this taxon is not clear.

Endococcus erraticus (A. Massal.) Nyl.

NOTES. – Reported from the Murmansk Region, growing on *Ophioparma ventosa* (Kihlman 1891: 59). Judging by the host, this record is probably *Muellerella ventosicola*. It was also reported from Konyam Bay, Chukotka Autonomous Area, growing on *Rhizocarpon alpicola* (Nylander 1887: 238). The latter identification needs to be verified because the differences between *Muellerella erratica* (current name of *Endococcus erraticus*) and closely related species of this genus are rather difficult to assess, especially without good optics (Triebel 1989) and because the *M. ventosicola* group has mainly been reported on *Rhizocarpon*, while *M. erratica* has usually been documented from other host genera (e.g., Brackel 2014).

Endococcus gemmiferus Taylor

NOTES. – Reported from Konyam Bay, Chukotka Autonomous Area, growing on *Catapyrenium cinereum* (= *Verrucaria tephroides*) (Nylander 1887: 220). This is an uncertain report because the relationship of this name to modern concepts of *Endococcus* species is not clear and according to Diederich et al. (2018) there are no *Endococcus* species that grow on *Catapyrenium*.

Endococcus pseudocarpus Nyl.

NOTES. – Reported from the Polar Urals (based on LE 260778; Zhurbenko 2013a). This record was subsequently revised to *Endococcus collematis* (Zhurbenko 2022).

Lecidea glaucomaria Nyl.

NOTES. – Reported from Konyam Bay, Chukotka Autonomous Area, "Supra thallum album incertum. Fere *Arthonia*." (Nylander 1887: 234). The current name of this lichenicolous fungus growing on *Lecanora rupicola* s. lat. is *Phacographa glaucomaria* (Diederich et al. 2018). As there is no precise identification of the host species, this report needs to be verified.

Lettauia cladoniicola D. Hawksw. & R. Sant.

NOTES. – Reported from the Nenets Autonomous Area (based on LE 210357; Zhurbenko 2008). That record was subsequently revised to *Cryptodiscus galaninae* (Pino-Bodas et al. 2017). Also reported as *Lettauia* cf. *cladoniicola* from the Putorana Plateau (based on LE 207133; Zhurbenko 2000), but the species identification is uncertain due to the scarcity of material (Pino-Bodas et al. 2017).

Lichenopeltella cladoniarum E.S. Hansen & Alstrup

NOTES. – Reported from the Murmansk Region (based on LE 207651; Zhurbenko 2001). This record was subsequently revised to *Lichenopeltella stereocaulorum* (Zhurbenko 2010a).

Muellerella lichenicola (Sommerf.) D. Hawksw.

NOTES. – Reported from the Republic of Sakha (Yakutia) (based on LE 207617; Karatygin et al. 1999). This record was subsequently revised to *Muellerella atricola* (Zhurbenko 2009b).

Phacopsis oroarcticae Zhurb.

NOTES. – The description of this species of lichenicolous fungus growing on the lichen *Brodoa oroarctica* (Zhurbenko 2010c) was based on a misinterpretation of the host's apothecia, which are rare. Accordingly, this name is synonymized here with *Brodoa oroarctica* below.

Brodoa oroarctica (Krog) Goward, Bryologist 89: 222. 1987. ≡ *Hypogymnia oroarctica* Krog, Lichenologist 6: 136. 1974. **TYPE: NORWAY.** SVALBARD (SPITZBERGEN): Lomfjorden, Dvergbreen, 14.viii.1931, *P.F. Scholander s.n.* (holotype, O L:332 n.v.).

= *Phacopsis oroarcticae* Zhurb., Mycosphere 1(3): 217. 2010. **TYPE: RUSSIA.** CENTRAL SIBERIA: Severnaya Zemlya Archipelago, Bol'shevik Island, near Antseva Cape, 78°12'N, 103°17'E, stony polar desert, "on lobes of *Brodoa oroarctica*", 16.vii.2000, *N. Matveeva s.n.* (holotype, LE 261782!).

Pharcidia lichenum (Arnold) Arnold

NOTES. – Reported from Novaya Zemlya, growing on *Polyblastia sendtneri* (Keissler 1928). The current name of this lichenicolous fungus is *Stigmidium lichenum* (Arnold) Triebel & P. Scholz. The report is doubtful however, as this species grows on *Verrucaria maculiformis* (Brackel 2014).

Polycoccum bryonthae (Arnold) Vězda

NOTES. – Reported from the Chukotka Autonomous Area, growing on the apothecial discs of *Bryoplaca jungermanniae* (based on LE 232983; Zhurbenko 2009a). The record is revised here to *Didymocyrtis consimilis*.

Pronectria robergei (Mont. & Desm.) Lowen

NOTES. – Reported from the Taymyr Peninsula (based on LE 233903, LE 233942, LE 260260, LE 260299b) and the Lena River delta (based on LE 260100), growing in hymenium of *Solorina* spp. (Zhurbenko 2009b). These records were subsequently revised to *Pronectria loweniae* (Senanayake et al. 2023).

Pronectria solorinae Lowen & R. Sant. (ined.)

NOTES. – Reported from Franz Josef Land (based on LE 207391) and Vize Island (based on LE 207390) (Zhurbenko & Santesson 1996). These records were subsequently revised to *Pronectria loweniae* (Senanayake et al. 2023).

Raciborskiomyces peltigericola (D. Hawksw.) M.E. Barr

NOTES. – Reported from the Nenets Autonomous Area (based on LE 210447; Zhurbenko 2008). This record was subsequently revised to *Trichosphaeria lichenum* (Zhurbenko 2009b).

Sagediopsis campsteriana (Linds.) D. Hawksw. & R. Sant.

NOTES. – Reported from Bennett Island in the New Siberian Islands (based on GZU, LE 207403, LE 207405, UPS; Zhurbenko & Santesson 1996). This record was subsequently revised to *Sagediopsis pertusariicola* (Zhurbenko 2009d).

Sclerococcum sphaerale (Ach.) Fr.

NOTES. – Reported from Novaya Zemlya, growing on *Lecanora rupicola* (as '*Lecanora glaucoma*'), *Solorina bispora*, and a sterile lichen (Keissler 1928). The identification of this material is doubtful as this species grows on *Lepra corallina* and possibly other saxicolous *Pertusaria* s. lat., but not on any of the reported hosts (Diederich et al. 2018).

Scutula epicladonia (Nyl.) Sacc.

NOTES. – Reported from the Taymyr Peninsula (based on LE 207407; Zhurbenko & Santesson 1996). This record was subsequently revised to *Sclerococcum ahtii* (Pino-Bodas et al. 2017).

Sphaerellothecium araneosum (Arnold) Zopf

NOTES. – Reports from the Putorana Plateau on *Stereocaulon paschale* (based on LE 207640a; Zhurbenko & Hafellner 1999), from the Taymyr Peninsula on *Arctoparmelia separata* (based on LE 207497), *Arctoparmelia* sp. (based on LE 207496) (Zhurbenko & Santesson 1996), *Cladonia pocillum* (based on LE 207494; Zhurbenko 1998, Zhurbenko & Pospelova 2001), and *Nephroma expallidum* (based on LE 207486; Zhurbenko & Pospelova 2001), from Severnaya Zemlya on *Stereocaulon rivulorum* (based on LE 232170) and *S. vesuvianum* (based on LE 232128) (Zhurbenko 2010a), and from the Chukotka Autonomous Area on *Stereocaulon apocalypticum* (based on LE 207643, M), *S. paschale* (based on LE 207645, M), and *S. wrightii* (based on LE 308968) (Karatygin et al. 1999) need to be verified because this species typically grows on *Lepra*, *Ochrolechia* and *Varicellaria* (Diederich et al. 2018).

Sphaerellothecium cladoniae (Alstrup & Zhurb.) Hafellner

NOTES. – Reports from the Putorana Plateau on *Stereocaulon paschale* (based on LE 207640) and *S. rivulorum* (based on LE 207660), and from the Chukotka Autonomous Area on *Stereocaulon apocalypticum* (based on LE 207643) and *S. wrightii* (based on LE 207644) (Zhurbenko & Triebel 2008) need to be verified because this species typically grows on *Cladonia* (Zhurbenko & Alstrup 2004).

Sphinctrina turbinata (Pers.: Fr.) De Not.

NOTES. – Reported from the Asian Arctic (under its synonym *S. gelasinata* (With.) Zahlbr.; Roms 1975) and the Polar Urals (Andreev et al. 1996) without specifying collection sites, collectors, examined herbarium specimens or literature sources. These reports are doubtful since according to Titov (2006) this species does not occur in the Arctic.

Stigmidium frigidum (Th. Fr. ex Sacc.) Alstrup & D. Hawksw.

NOTES. – Reports from Franz Josef Land (based on LE 207535, LE 207536, LE 207540, LE 207544, LE 207546), Vize Island (based on LE 207534), Severnaya Zemlya (based on LE 207531), and the New Siberian Islands (based on LE 207542) (Karatygin et al. 1999, Zhurbenko & Santesson 1996) were subsequently revised to *Sphaerellothecium taimyricum* (Zhurbenko 2012). Reports from Franz Josef Land (based on LE 207535, LE 207536, LE 207540, LE 207544, LE 207545a, LE 207546), Taymyr Peninsula (based on LE 207477, LE 207538, LE 207541, LE 207543), and Wrangel Island (based on LE 210405) (Karatygin et al. 1999, Zhurbenko 2008, Zhurbenko & Pospelova 2001, Zhurbenko & Santesson 1996) were subsequently revised to *Sphaerellothecium thamnoliae* var. *thamnoliae* (Zhurbenko 2012).

Unguiculariopsis groenlandiae (Alstrup & D. Hawksw.) Etayo & Diederich

NOTES. – Reported from Severnaya Zemlya (based on LE 207161; Karatygin et al. 1999, Zhurbenko 2007b). This record is revised here to *Rhymbocarpus neglectus*.

Verrucaria microthelia Wallr.

NOTES. – Reported from Gydan Peninsula, growing on *Acarospora* spp. (Andreev 1994). The current name of this lichenicolous fungus is *Roselliniella microthelia* (Wallr.) Nik. Hoffm. & Hafellner. The report is doubtful, as this species grows on *Trapelia* (Diederich et al. 2018).

Zwackhiomyces coepulonus (Norman) Grube & R. Sant.

NOTES. – Reported from the Nenets Autonomous Area (based on LE 261748a) and Taymyr Peninsula (based on LE 261598a; Zhurbenko 2009b). These records were subsequently revised to *Zwackhiomyces sphinctrinoides* (Zhurbenko et al. 2012).

ACKNOWLEDGEMENTS

The author is grateful to his teacher, Prof. Rolf Santesson, who introduced him to the world of lichenicolous fungi. Collaboration with the world's leading experts on this group of fungi, Josef Hafellner, Paul Diederich, Dagmar Triebel, Vagn Alstrup, and Wolfgang von Brackel, as well as the opportunity to work in the herbaria of Uppsala (UPS), Graz (GZU), Munich (M), and Copenhagen (C), which contain the largest collections of lichenicolous fungi, was of great importance. The author thanks O. M. Afonina, A. A. Dobrysh, M. V. Gavrilo, G. Grosse, A. E. Katenin, O. V. Khitun, S. S. Kholod, I. YU. Kirtsideli, YU. P. Kozhevnikov, V. V. Kunitskiĭ, V. B. Kuvaev, I. A. Lavrinenko, O. V. Lavrinenko, I. I. Makarova, N. V. Matveeva, E. B. Pospelova, M. B. Samarskii, V. P. Shevchenko, O. I. Sumina, A. N. Titov, D. A. Walker, L. L. Zanokha, and I. S. Zhdanov for permission to review their lichen collections for lichenicolous fungi. Most of the author's field research in the Russian Arctic was carried out as part of expeditions of the Arctic and Antarctic Research Institute (St Petersburg, Russia) and the Alfred-Wegener-Institut für Polar- und Meeresforschung (Bremerhaven, Germany) under the leadership of Dmitriĭ Bol'shiianov and Eva-Maria Pfeiffer. This study was carried out within the framework of the research project of the V. L. Komarov Botanical Institute of the Russian Academy of Sciences 'Taxonomic, ecological and structural-functional diversity of fungi and fungus-like protists' (124013100829-3). James Lendemer and Caleb Morse are heartily thanked for many valuable suggestions for improving the manuscript.

LITERATURE CITED

ALA-LC Romanization tables for Russian. Available from https://en.wikipedia.org/wiki/ALA-LC_romanization_for_Russian. Accessed 15 November 2023.

Alstrup, V. 2004. New records in distribution of lichens and lichenicolous fungi. Graphis Scripta 16: 46–57.

Andreev, M.P. 1994. The lichen flora of the lower reaches of the Chugoriyakh River (south-western part of the Gydan Peninsula, west Siberian Arctic). Botanicheskii Zhurnal (St Petersburg) 79: 39–50. (In Russian).

Andreev, M., Y. Kotlov and I. Makarova. 1996. Checklist of Lichens and Lichenicolous Fungi of the Russian Arctic. The Bryologist 99: 137–169.

Brackel, W. von. 2014. Kommentierter Katalog der flechtenbewohnenden Pilze Bayerns. Bibliotheca Lichenologica 109: 1–476.

Brittannica Online. Available from https://www.britannica.com/topic/Britannica-Online. Accessed 15 November 2023.

CAVM Team. 2003. Circumpolar Arctic Vegetation [Map]. Anchorage, Alaska. Available from: https://digital.library.unt.edu. Accessed 20 December 2023.

Chernov, Yu. I. 2008. *Ecology and biogeography. Selected works*. Moscow: KMK Scientific Press. 580 pp. (In Russian).

Chesnokov, S.V. and L.A. Konoreva. 2023. New records of lichenized and lichenicolous fungi from the Franz Josef Land (Russian Arctic). Novosti sistematiki nizshikh rastenii (St Petersburg) 57: L39–L48.

Chesnokov, S.V., L.A. Konoreva and E.A. Davydov. 2022. Addition to the lichen biota of Franz Josef Land archipelago. Czech Polar Reports 12: 78–88.

Constitution of the Russian Federation. Available from http://www.constitution.ru/en/10003000-04.htm. Accessed 15 November 2023.

Czernyadjeva, I.V., E.A. Davydov, A.A. Efimova, R.M. Gogorev, D.E. Himelbrant, V.M. Kotkova, E.Yu. Kuzmina, A.V. Leostrin, E.L. Moroz, V.Yu. Neshataeva, A.A. Notov, Yu.K. Novozhilov, A.G. Paukov, N.N. Popova,

A.D. Potemkin, I.S. Stepanchikova, Yu.V. Storozhenko, L.S. Yakovchenko, M.I. Yurchak, L.F. Volosnova, M.P. Zhurbenko and M.V. Zyatnina. 2021. New cryptogamic records. 7. Novosti sistematiki nizshikh rastenii (St Petersburg) 55: 249–277.

Diederich, P. 2021. Notes on lichenicolous taxa of the asexual fungal genera *Intralichen* and *Trimmatostroma*, with a revised key and descriptions of four new species. Herzogia 34: 101–126.

Diederich, P. and J. Etayo. 2000. A synopsis of the genera *Skyttea*, *Llimoniella* and *Rhymbocarpus* (lichenicolous Ascomycota, Leotiales). The Lichenologist 32: 423–485.

Diederich, P. and M.P. Zhurbenko. 1997. *Taeniolella rolfii* sp. nov., a new lichenicolous hyphomycete from the Siberian Arctic. Acta Universitatis Upsaliensis Symbolae Botanicae Upsalienses 32(1): 11–16.

Diederich, P. and M.P. Zhurbenko. 2001. Nomenclatural notes on *Taeniolella rolfii* (lichenicolous hyphomycetes). Graphis Scripta 12: 37–40.

Diederich, P., M. Zhurbenko and J. Etayo. 2002. The lichenicolous species of *Odontotrema* (syn. *Lethariicola*) (Ascomycota, Ostropales). The Lichenologist 34: 479–501.

Diederich, P., D. Ertz and J. Etayo. 2010. An enlarged concept of *Llimoniella* (lichenicolous Helotiales), with a revised key to the species and notes on related genera. The Lichenologist 42: 253–269.

Diederich, P., J.D. Lawrey and D. Ertz. 2018. The 2018 classification and checklist of lichenicolous fungi, with 2000 non-lichenized, obligately lichenicolous taxa. The Bryologist 121: 340–425.

Evdokimov, G., O. Afonina, L. Konoreva, R. Obabko, Y. Mamontov, S. Chesnokov, I.V. Frolov and U.V. Babiy. 2022. Flora of lichens, mosses and liverworts of Wrangel Island: New records. Polish Polar Research 43: 145–163.

Ertz, D., P. Diederich, J.D. Lawrey, F. Berger, C.E. Freebury, B. Coppins, A. Gardiennet and J. Hafellner. 2015. Phylogenetic insights resolve Dacampiaceae (Pleosporales) as polyphyletic: *Didymocyrtis* (Pleosporales, Phaeosphaeriaceae) with *Phoma*-like anamorphs resurrected and segregated from *Polycoccum* (Trypetheliales, Polycoccaceae fam. nov.). Fungal Diversity 74: 53–89.

Fleischhacker, A., M. Grube, A. Frisch, W. Obermayer and J. Hafellner. 2016. *Arthonia parietinaria* – a common but frequently misunderstood lichenicolous fungus on species of the *Xanthoria parietina*-group. Fungal Biology 120: 1341–1353.

Hansen, E.S. and V. Alstrup. 1995. The lichenicolous fungi on *Cladonia* subgenus *Cladina* in Greenland. Graphis Scripta 7: 33–38.

Hawksworth, D.L. 1982. Secondary fungi in lichen symbioses: parasites, saprophytes and parasymbionts. Journal of the Hattori Botanical Laboratory 52: 357–366.

Hawksworth, D.L. 2003. The lichenicolous fungi of Great Britain and Ireland: an overview and annotated checklist. The Lichenologist 35: 191–232.

Hawksworth, D.L. and B.J. Dyko. 1979. *Lichenodiplis* and *Vouauxiomyces*: two genera of lichenicolous coelomycetes. The Lichenologist 11: 51–61.

Hertel, H. and M.P. Andreev. 2003. On some saxicolous lecideoid lichens of the Beringian Region and adjacent areas of eastern Siberia and the Russian Far East. The Bryologist 106: 539–551.

Heuchert, B. and U. Braun. 2014. Two new lichen-associated *Trimmatostroma* species. Herzogia 27: 227–236.

Heuchert, B., M.P. Zhurbenko and U. Braun. 2014. Reassessment of the lichenicolous hyphomycete genus *Talpapellis*. Herzogia 27: 83–92.

Heuchert, B., U. Braun, P. Diederich and D. Ertz. 2018. Taxonomic monograph of the genus *Taeniolella* s. lat. (Ascomycota). Fungal Systematics and Evolution 2: 69–261.

Heuchert, B., P. Diederich, M.P. Zhurbenko and U. Braun. 2019. *Taeniolella diploschistis* sp. nov. – a new lichenicolous fungus on *Diploschistes scruposus*. Herzogia 32: 94–100.

Ihlen, P.G. 1998. The lichenicolous fungi on species of the genera *Baeomyces*, *Dibaeis*, and *Icmadophila* in Norway. The Lichenologist 30: 27–57.

Karatygin, I.V., E.L. Nezdoiminogo, Y.K. Novozhilov and M.P. Zhurbenko. 1999. *Russian Arctic fungi. Annotated checklist*. St Petersburg: Khimiko-Pharmatsevticheskaya Akademiya. 212 pp. (In Russian, English summary).

Keissler, K. 1928. Flechtenparasiten. Report of the Scientific Results of the Norwegian Expedition to Novaya Zemlya 1921 38: 3–5.

Kihlman, A.O. 1891. Neue Beiträge zur Flechten-Flora der Halb-insel Kola. Meddelanden af Societs pro Fauna et Flora Fennica 18: 41–59.

Kozhevnikov, Yu.P., M.P. Zhurbenko and O.M. Afonina. 1994. Vegetation cover of Sverdrup and Troinoy islands, Kara Sea. In: Rogacheva, E.V. (ed.). *Arctic tundras of the Taymyr and Kara Sea islands. Volume 2*. Moscow. Pp. 121–143. (In Russian).

Kümmerling, H., D. Triebel and G. Rambold. 1993. *Lepraria neglecta* and its lichenicolous fungi. Bibliotheca Lichenologica 53: 147–160.

Lawrey, J.D. and P. Diederich. 2003. Lichenicolous fungi: interactions, evolution, and biodiversity. The Bryologist 106: 80–120.

Leontyev, D.V. 2008. *Floristic analysis in mycology*. Kharkov: Ranok-NT. 110 pp. (In Russian).

Lind, J. 1924. Ascomycetes and Fungi imperfecti. Report of the Scientific Results of the Norwegian Expedition to Novaya Zemlya 1921 19: 1–28.

Lücking, R., B.P. Hodkinson and S.D. Leavitt. 2017. The 2016 classification of lichenized fungi in the Ascomycota and Basidiomycota–Approaching one thousand genera. The Bryologist 119: 361–416.
Lynge, B. 1928. Lichens from Novaya Zemlya (exclusive of Acarospora and Lecanora). Report of the Scientific Results of the Norwegian Expedition to Novaya Zemlya 1921 43: 1–299.
Matveeva, N.V. 1998. Zonation in plant cover of the Arctic. Proceedings of the Komarov Botanical Institute (Russian Academy of Sciences) 21: 1–220. (In Russian).
Morozova, O. and E. Popov (eds). 2008. *Mycotheca Petropolitana ab Instituto Botanico nomine V. L. Komarovii Academiae Scientiarum Rossicae edita (series exsiccatorum). Fasc. III–V (nos. 41–100).* St Petersburg. 32 pp.
Motiejūnaitė, J., M.P. Zhurbenko, A. Suija and G. Kantvilas. 2019. Lichenicolous ascomycetes on *Siphula*-like lichens, with a key to the species. The Lichenologist 51: 45–73.
Navarro-Rosinés, P., M.P. Zhurbenko and C. Roux. 2010. *Pseudopyrenidium* nova genro por inkludi *Weddellomyces tartaricola* (nelikeniĝinta fungo likenloĝa, *Ascomycota*). Bulletin de la Société linnéenne de Provence 61: 129–140.
Nordin, A. 2000. Taxonomy and phylogeny of *Buellia* species with pluriseptate spores (Lecanorales, Ascomycotina). Symbolae Botanicae Upsalienses 33: 1–117.
Nylander, W. 1866 (1882). Lichenes Lapponiae orientalis. Notiser ur Sällskapets pro Fauna et Flora Fennica förhandlingar 1866 (1882). Häft 8 (ny ser. 5). P. 101–192. (Separately printed in 1866, as "Prodromi Lichenographiae Scandinaviae supplementum. Lichenes Lapponiae orientalis", with the same pagination).
Nylander, W. 1887. Enumeratio lichenum freti Behringii. Bulletin de la Société Linnéenne de Normandie. Ser. 4. 1: 198–286.
Olson, D.M., E. Dinerstein, E.D. Wikramanayake, N.D. Burgess, G.V.N. Powell, E.C. Underswood, J.A. D'Amico, I. Itoua, H.E. Strand, J.C. Morrison, C.J. Loucks, T.F. Allnutt, T.H. Ricketts, Y. Kura, J.F. Lamoreux, W.W. Wettengel, P. Hedao, and K.R. Kassem. 2001. Terrestrial Ecoregions of the World: A new map of life on Earth. BioScience 51: 933–938.
Pino-Bodas, R., M.P. Zhurbenko and S. Stenroos. 2017. Phylogenetic placement within Lecanoromycetes of lichenicolous fungi associated with *Cladonia* and some other genera. Persoonia 39: 91–117.
Räsänen, V. 1943. Petsamon jäkäläkasvisto. Annales Botanici Societatis Zoologicae-Botanicae Fennicae 'Vanamo'18: 1–110.
Roms, E.G. 1975. Fam. Caliciaceae. In: Abramov, I.I. and K.A. Rassadina (eds). *Handbook of the lichens of the U.S.S.R. Issue 3. Caliciaceae – Gyalectaceae*. Leningrad: Nauka. Pp. 7–37. (In Russian).
Samarskii, M.B., M.V. Sokolova, M.P. Zhurbenko and O.M. Afonina. 1997. On the flora and vegetation of the Zhokhov Island, New Siberian islands. Botanicheskii Zhurnal (St Petersburg) 82: 62–70. (In Russian, English summary).
Santesson, R. 1998. Fungi lichenicoli exsiccati. Fasc. 11 & 12 (nos. 251–300). Thunbergia 28: 1–19.
Senanayake, I.C., W. Rossi, M. Leonardi A. Weir, M. McHugh, K.C. Rajeshkumar, R.K. Verma, S.C. Karunarathna, S. Tibpromma, N. Ashtekar, S.K. Ashtamoorthy, S. Raveendran, G. Kour, A. Singh, S. De la Peña-Lastra, A. Mateos, M. Kolařík, V. Antonín, H. Ševčíková, F. Esteve-Raventós…, and J. Song (104 authors).. 2023. Fungal diversity notes 1611–1716: taxonomic and phylogenetic contributions on fungal genera and species emphasis in south China. Fungal Diversity 122: 161–403.
Suija, A., P. van den Boom, E. Zimmermann, M.P. Zhurbenko and P. Diederich. 2018a. Lichenicolous species of *Hainesia* belong to Phacidiales (Leotiomycetes) and are included in an extended concept of *Epithamnolia*. Mycologia 109: 882–899.
Suija, A., D.L. Hawksworth and S. Pérez-Ortega. 2018b. The generic name *Abrothallus* (Abrothallales, Dothideomycetes), and names proposed in the genus by Giuseppe De Notaris, Søren Christian Sommerfelt, and Ignaz Kotte. Taxon 67: 1169–1179.
The Museum of evolution herbarium, Uppsala University. Available from https://databas.evolutionsmuseet.uu.se/botanik/home.php. Accessed 10 December 2024.
Titov, A.N. 2006. *Mycocalicioid fungi (the order Mycocaliciales) of Holarctic*. Moscow: KMK Scientific Press. 296 pp. (In Russian).
Triebel, D. 1989. Lecideicole Ascomyceten. Bibliotheca Lichenologica 35: 1–278.
Triebel, D. 2003. Microfungi exsiccati. Fasc. 19–22 (no. 451–550). Arnoldia (München) 22: 1–42.
Triebel, D. 2006. Microfungi exsiccati. Fasc. 23–26 (no. 551–650). Arnoldia (München) 25: 1–44.
Urbanavichus, G.P. 2010. *A checklist of the lichen flora of Russia*. St Petersburg: Nauka. 194 pp. (In Russian, English summary).
Vainio (Wainio), E.A. 1909. Lichenes in viciniis stationis hibernae expeditionis Vegae prope pagum Pitlekai in Sibiria septentrionali a D:re E. Almquist collecti. Praefationem scripsit E. Almquist. Arkiv för Botanik 8: 1–175.
Wedin, M., P.G. Ihlen and D. Triebel. 2007. *Scutula tuberculosa*, the correct name of the *Scutula* growing on *Solorina* spp., with a key to *Scutula* s. str. in the Northern Hemisphere. The Lichenologist 39: 329–333.
Wikidata. Available from https://www.wikidata.org/wiki/Wikidata:Main_Page. Accessed 15 November 2023.
Yurtsev, B.A. 1968. *Flora of Suntar-Khayat. Problems of the history of high-mountain landscapes of the North-East of Siberia.* Leningrad: Nauka. 235 pp. (In Russian).

Yurtsev, B.A. 1977. On the correlation of arctic and high-mountain subarctic floras. In: Karamysheva, Z.V. (ed.). *Problems of ecology, phytocenology, botanical geography and floristics: A collection of scientific papers*. Leningrad: Nauka. Pp. 125–139. (In Russian).
Yurtsev, B.A. 1987. Flora as a basic concept of floristics: content of the concept, approaches to the study. In: *Theoretical and methodological problems of comparative floristics: Materials of the II workshop on comparative floristics*. Leningrad: Nauka. Pp. 13–28. (In Russian).
Yurtsev, B.A. 2004. Development of comparative floristics in Russia: the contribution of the school of A. I. Tolmachev. In: *Proceedings of the VI workshop on comparative floristics*. Syktyvkar. Pp. 9–19. (In Russian).
Zhurbenko, M.P. 1998. Lichens and lichenicolous fungi from the north of Pyasino lake, Taimyr peninsula, Siberia. Folia Cryptogamica Estonica 32: 153–159.
Zhurbenko, M.P. 2000. *Lichens and lichenicolous fungi of the Putoransky Reserve*. Flora and fauna of nature reserves. Issue. 89. Moscow: RAS Commission on Protected Areas and IPEE RAS. 55 pp.
Zhurbenko, M.P. 2001. Lichenicolous fungi from Murmansk region of Russia. Mikologiya i Fitopatologiya (St Petersburg) 35: 34–40.
Zhurbenko, M.P. 2002a. *Arthonia triebeliae* (Arthoniales), a new lichenicolous fungus from the Arctic. Mycological Progress 1: 137–141.
Zhurbenko, M.P. 2002b. Lichenicolous fungi from the Polar Ural. Mikologiya i Fitopatologiya (St Petersburg) 36: 9–14.
Zhurbenko, M.P. 2002c. Lichenicolous genus *Cercidospora* (Dothideales, Ascomycota) in the north of Russia. Mikologiya i Fitopatologiya (St Petersburg) 36: 3–10.
Zhurbenko, M. 2007a. *Corticifraga santessonii* and *C. chugachiana* (Lecanoromycetes, Ascomycota), new species of lichenicolous fungi from the Holarctic. The Lichenologist 39: 221–226.
Zhurbenko, M.P. 2007b. The lichenicolous fungi of Russia: Geographical overview and a first checklist. Mycologia Balcanica 4: 105–124.
Zhurbenko, M. 2007c. New lichenicolous fungi from Eurasia. Graphis Scripta 19: 1–9.
Zhurbenko, M.P. 2008. Lichenicolous fungi from Russia, mainly from its Arctic. II. Mycologia Balcanica 5: 13–22.
Zhurbenko, M.P. 2009a. Lichenicolous fungi and some lichens from the Holarctic. Opuscula Philolichenum 6: 87–120.
Zhurbenko, M.P. 2009b. Lichenicolous fungi and lichens from the Holarctic. Part II. Opuscula Philolichenum 7: 121–186.
Zhurbenko, M.P. 2009c. New and interesting lichenicolous hypocrealean fungi from the Northern Hemisphere. Sydowia 61: 177–188.
Zhurbenko, M. 2009d. *Sagediopsis pertusariicola* (Verrucariales), a new lichenicolous ascomycete from the Arctic. Nova Hedwigia 88: 549–555.
Zhurbenko, M.P. 2010a. Lichenicolous fungi and lichens growing on *Stereocaulon* from the Holarctic, with a key to the known species. Opuscula Philolichenum 8: 9–39.
Zhurbenko, M.P. 2010b. *Lichenicolous fungi of the Russian Arctic. Dissertation for the degree of Doctor of Biological Sciences (unpublished Ms)*. St Petersburg: Komarov Botanical Institute RAS. 353 pp. (In Russian).
Zhurbenko, M.P. 2010c. New and interesting lichenicolous fungi from Eurasia. II. Mycosphere 1: 213–222.
Zhurbenko, M.P. 2011. Lichenicolous mycobiota of the Russian Arctic: taxonomic analysis. Mikologiya i Fitopatologiya (St Petersburg) 45: 387−396. (In Russian, English summary).
Zhurbenko, M.P. 2012. Lichenicolous fungi growing on *Thamnolia*, mainly from the Holarctic, with a worldwide key to the known species. The Lichenologist 44: 147–177.
Zhurbenko, M.P. 2013a. *Hainesia peltigerae* sp. nov. and some other interesting lichenicolous fungi from Eurasia. Graphis Scripta 25: 39–43.
Zhurbenko, M.P. 2013b. Lichenicolous fungi and some allied lichens from the Canadian Arctic. Opuscula Philolichenum 12: 180–197.
Zhurbenko, M.P. 2015. *Sphaerellothecium siphulae* (Dothideomycetes incertae sedis), a new lichenicolous fungus on *Siphula ceratites* from the Arctic. Nova Hedwigia 101: 419–425.
Zhurbenko, M.P. 2020a. *Clypeococcum lenae* (Dothideomycetes), a new lichenicolous species from the Arctic, with a key to species of lichenicolous fungi on *Solorina*. Opuscula Philolichenum 19: 199–207.
Zhurbenko, M.P. 2020b. Lichenicolous fungi from the Holarctic. Part III: New reports and a key to species on *Hypogymnia*. Opuscula Philolichenum 19: 180–189.
Zhurbenko, M.P. 2021a. Lichenicolous fungi from the Holarctic. Part IV: New reports and a key to species on *Dermatocarpon*. Opuscula Philolichenum 20: 44–53.
Zhurbenko, M.P. 2021b. *Lichenochora sedelnikoviorum*, a new species from the Russian Arctic with a synopsis of published additions to the Panarctic checklist of lichenicolous fungi. Opuscula Philolichenum 20: 73–80.
Zhurbenko, M.P. 2021c. New species of lichenicolous fungi on *Solorina*. Herzogia 34: 127–137.
Zhurbenko, M.P. 2021d. Noteworthy lichenicolous fungi and lichens from Russia. Folia Cryptogamica Estonica 58: 45–50.
Zhurbenko, M.P. 2022. Lichenicolous fungi from the Holarctic. Part V. Novosti sistematiki nizshikh rastenii (St Petersburg) 56: 301–308.

Zhurbenko, M.P. 2023a. Contributions to the knowledge of lichenicolous fungi growing on Pannariaceae, including four new species and an identification key. Herzogia 36: 131–160.
Zhurbenko, M.P. 2023b. Contributions to the knowledge of lichenicolous fungi growing on Sphaerophoraceae, with a key to the species. Herzogia 36: 504–523.
Zhurbenko, M. P. 2023c. Hidden biodiversity in herbarium collections: experience of searching for lichenicolous fungi in lichen herbaria. Novosti sistematiki nizshikh rastenii (St Petersburg) 57: F13–F18.
Zhurbenko, M.P. and V. Alstrup. 2004. Lichenicolous fungi on *Cladonia* mainly from the Arctic. Acta Universitatis Upsaliensis Symbolae Botanicae Upsalienses 34: 477–499.
Zhurbenko, M.P. and W. von Brackel. 2013. Checklist of lichenicolous fungi and lichenicolous lichens of Svalbard, including new species, new records and revisions. Herzogia 26: 323 –359.
Zhurbenko, M.P. and U. Braun. 2013. *Ameroconium cladoniae* gen. et sp. nov. and *Phoma psoromatis* sp. nov., new anamorphic lichenicolous fungi from the Holarctic. The Lichenologist 45: 583–591.
Zhurbenko, M.P. and P. Diederich P. 2024. One new genus and six new species of lichenicolous hyphomycetes. Herzogia 37: 48–61.
Zhurbenko, M.P. and M. Grube. 2010. *Arthonia pannariae* (Arthoniaceae, Arthoniales), a new lichenicolous fungus from northern Holarctic. Graphis Scripta 22: 47−51.
Zhurbenko, M.P. and J. Hafellner. 1999. Lichenicolous fungi from the Putorana Plateau, Siberian Subarctic. Folia Cryptogamica Estonica 34: 71–79.
Zhurbenko, M.P. and N.V. Matveeva. 2006. Terricolous lichens of the Bol'shevik Island (Severnaya Zemlya archipelago). Botanicheskii Zhurnal (St Petersburg) 91(10): 1457–1484. (In Russian, English summary).
Zhurbenko, M.P. and A.A. Notov. 2015. The lichenicolous lichen *Placocarpus americanus* and some noteworthy lichenicolous fungi from Russia. Folia Cryptogamica Estonica 52: 95–99.
Zhurbenko, M.P. and R. Pino-Bodas. 2017. A revision of lichenicolous fungi growing on *Cladonia*, mainly from the Northern Hemisphere, with a worldwide key to the known species. Opuscula Philolichenum 16: 188–266.
Zhurbenko, M.P. and E.B. Pospelova. 2001. Lichenes ac fungi lichenophili in vicinitate lacus Syrutaturku (reservatum Taimyricum, Taimyr Centralis). Novosti sistematiki nizshikh rastenii (St Petersburg) 34: 134–139. (In Russian).
Zhurbenko, M.P. and R. Santesson. 1996. Lichenicolous fungi from the Russian Arctic. Herzogia 12: 147–161.
Zhurbenko, M. and D. Triebel. 2003. *Cercidospora lecidomae* (Dothideales, Ascomycetes), a new lichenicolous fungus from the North Holarctic. Bibliotheca Lichenologica 86: 205–214.
Zhurbenko, M.P. and D. Triebel. 2005. *Lasiosphaeriopsis pilophori* sp. nov. (Sordariales) and other lichenicolous fungi on *Pilophorus*. Mycological Progress 4: 317–323.
Zhurbenko, M.P. and D. Triebel. 2008. Three new species of *Stigmidium* and *Sphaerellothecium* (lichenicolous ascomycetes) on *Stereocaulon*. Mycological Progress 7: 137–145.
Zhurbenko, M.P. and I.S. Zhdanov. 2013. *Melaspilea galligena* sp. nov. and some other lichenicolous fungi from Russia. Folia Cryptogamica Estonica 50: 89–99.
Zhurbenko, M.P. and E.V. Zheludeva. 2015. Lichenicolous fungi from Russia, mainly from the Magadan Region. Folia Cryptogamica Estonica 52: 101–107.
Zhurbenko, M.P., I.V. Czernyadjeva and Yu.P. Kozhevnikov. 2002. Lichens, lichenicolous fungi, mosses and vascular plants of Samoilovskii Island (Ust-Lenskii Reserve, Arctic Yakutiya). Novosti sistematiki nizshikh rastenii (St Petersburg) 36: 100–113. (In Russian).
Zhurbenko, M.P., M.K. Raynolds, D.A. Walker and N.V. Matveeva. 2005. Lichens and lichenicolous fungi from the Kolyma delta region, Russian Arctic. Graphis Scripta 17: 27–31.
Zhurbenko, M.P., D.E. Himelbrant, E.S. Kuznetsova and I.S. Stepanchikova. 2012. Lichenicolous fungi from the Kamchatka Peninsula, Russia. The Bryologist 115: 295−312.
Zhurbenko, M.P., O. Enkhtuya and S. Javkhlan. 2019. A first synopsis of lichenicolous fungi of Mongolia, with the description of five new species. Plant and Fungal Systematics 64: 345–366.

APPENDIX 1 – COLLECTION LOCATIONS OF LICHENICOLOUS FUNGI IN THE RUSSIAN META-ARCTIC

Locations in the list below are ordered in the same way as in the catalogue itself (i.e., first by administrative regions of Russia, ordered from west to east and from north to south (Figure 6), then by toponyms, given alphabetically by keyword). The spellings of the administrative regions are given according to the Constitution of the Russian Federation (2023), those of other toponyms according to Brittannica Online (2023) or Wikidata (2023), and if they are not available there, transliterated from Russian names given in publications or on herbarium labels according to the ALA-LC Romanization tables for Russian (2023).

Figure 6. Administrative regions of Russia that include Meta-arctic: M – Murmansk Region, A – Arkhangelsk Region, N – Nenets Autonomous Area, Ko – Komi Republic, Y-N – Yamal-Nenets Autonomous Area, Kr – Krasnoyarsk Territory, S(Y) – Republic of Sakha (Yakutia), C – Chukotka Autonomous Area.

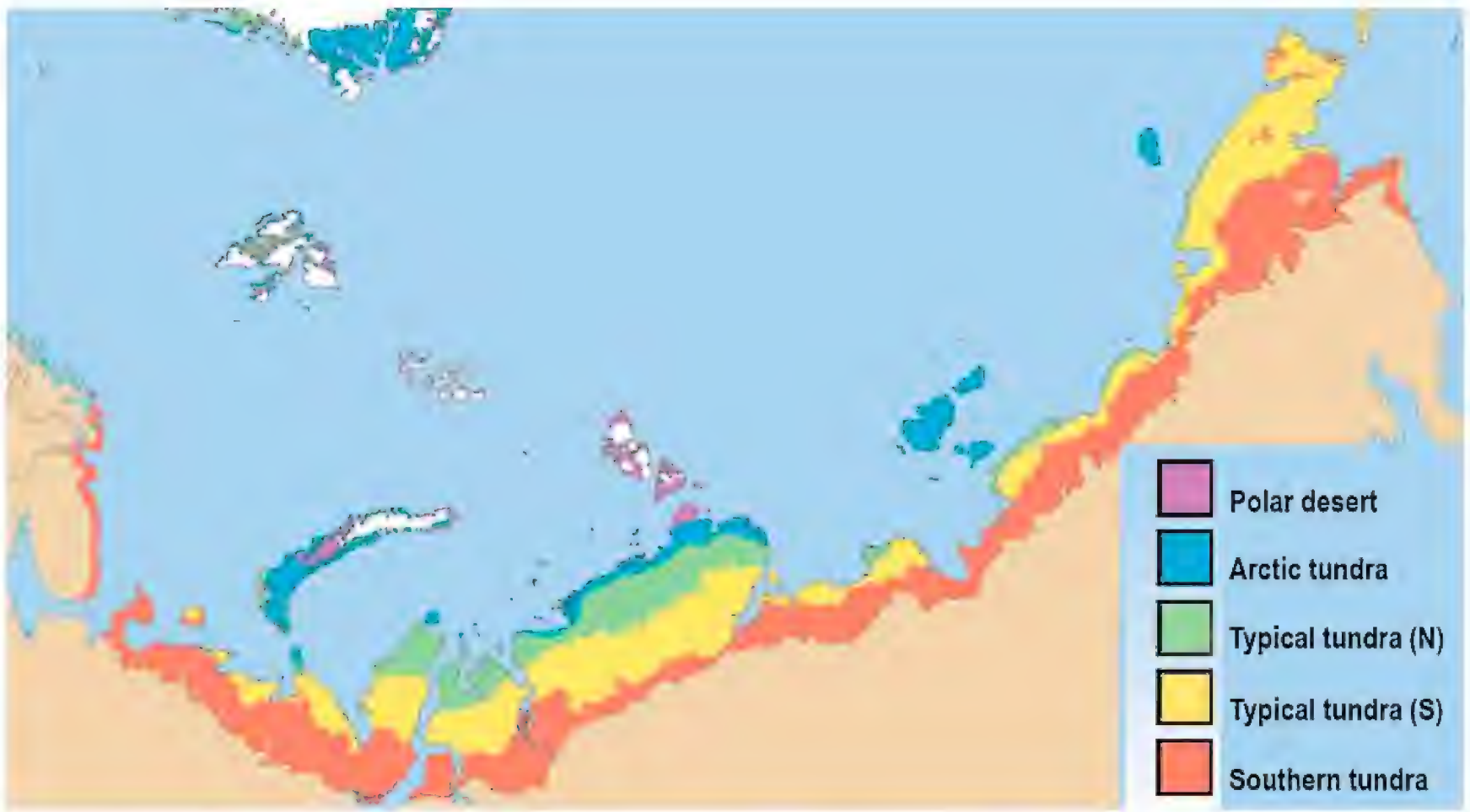

Figure 7. Bioclimate zonal subdivisions of the Russian Arctic proper. Adapted from CAVM Team (2003). Note. The typical tundra subzone is divided on the cited map into northern (N) and southern (S) parts, however, in accordance with Matveeva (1998), these are not distinguished here.

In addition to toponyms, geographic coordinates to the nearest minute, year(s) of collection, collector(s), and affiliation with a bioclimate zonal subdivision of the Arctic proper (Figure 7) and adjoining more southerly areas are given for each location. Within the Arctic proper, collection locations are distributed as follows: polar desert (43 locations), arctic tundra (42 locations), typical tundra (92 locations), southern tundra (28 locations), typical tundra–southern tundra (2 locations). Additionally, forest tundra (12 locations), southern tundra–forest tundra (2 locations), mountain tundra (15 locations), and forest tundra–mountain tundra (1 location) were surveyed.

Where information on any of these items was not available, the literature source of the known information is given. Geographical coordinates are usually given for the centre of the collection area. For collection locations in the adjacent subarctic highlands, where the lower altitudinal belts are composed of northern taiga or *Pinus pumila* thickets, the latter are indicated in brackets, however, specimens collected in these belts were not included in the catalogue.

The number of documented species of lichenicolous fungi is given in parentheses for administrative regions of Russia and selected geographical delineations.

MURMANSK REGION (56 species documented)

- Dal'nie Zelentsy settlement, Barents Sea coast, 69°07′N, 36°04′′E, 1997, M. P. Zhurbenko, southern tundra.
- Oleniĭ Island, Barents Sea, 69°15′N, 34°42′E, southern tundra; the date of collection and the collector are unclear (Nylander 1866).
- Olenka River mouth, Barents Sea coast, 69°02′N, 36°25′E, 1997, M. P. Zhurbenko, southern tundra.
- Cape Orlov, 20 km north-east of Ponoĭ settlement, White Sea coast, 67°12′N, 41°19′E, 1889, A. O. Kihlman, southern tundra.
- Porchnikha Bay, Barents Sea coast, 69°04′N, 36°15′E, 1997, M. P. Zhurbenko, southern tundra.
- Shel'pino Bay, Barents Sea coast, 69°05′N, 36°12′E, 1997, M. P. Zhurbenko, southern tundra.
- Teriberka settlement, Barents Sea coast, 69°09′N, 35°10′E, 1977, A. V. Dombrovskaia, southern tundra.
- 15 km north of Tumannyĭ settlement, 69°01′N, 35°48′E, 1997, M. P. Zhurbenko, forest tundra.
- Vaĭda-Guba, Barents Sea coast, 69°55′N, 31°58′E, southern tundra; the date of collection and the collector are unclear (Räsänen 1943).
- Voron'ia River mouth, Barents Sea coast, 69°09′N, 35°50′E, 1997, M. P. Zhurbenko, southern tundra.

ARKHANGELSK REGION (64 species documented)

FRANZ JOSEF LAND ARCHIPELAGO (54 species documented)

- Aagaard Island, 80°00′N, 56°24′E, 1930, V. P. Savicz, polar desert.
- Alexandra Land, 80°39–44′N, 46°50'–47°54′E, 1959, V. D. Alexandrova; 2019, S. V. Chesnokov, L. A. Konoreva; polar desert.
- Alger Island, 80°23′N, 56°02′E, 1930, V. P. Savicz, polar desert.
- Bell Island, 80°00′N, 49°16′E, 1930, V. P. Savicz, polar desert.
- George Land Island, 80°48′N, 50°28′E, 2019, S. V. Chesnokov, L. A. Konoreva, polar desert.
- Hayes (Heiss) Island, 80°36′N, 57°54′E, 2010, D. A. Walker, polar desert.
- Hooker Island, 80°14–20′N, 52°47'–53°02′E, 1930, Demme, V. P. Savicz; 1979, I. N. Safronova; 2019, L. A. Konoreva; polar desert.
- Jackson Island, 81°12′N, 55°33′E, 2019, L. A. Konoreva, polar desert.
- McClintock Island, 80°11′N, 56°34′E, 1930, V. P. Savicz, polar desert.
- Northbrook Island, 79°59′N, 50°58′E, 1930, V. P. Savicz, polar desert.
- Scott Kelly (Scott-Kel'ty) Island, 80°20′N, 52°24′E, 1930, V. P. Savicz, polar desert.
- Ziegler Island, 80°52'–81°04′N, 56°18'–57°17′E, 2019, S. V. Chesnokov, L. A. Konoreva, polar desert.

NOVAYA ZEMLYA ARCHIPELAGO (19 species documented)

- Gusinaia Zemlia Peninsula, Southern Island, 72°03′N, 52°18′E, 1921, B. Lynge, typical tundra.
- Ivanova Bay, Northern Island, 76°50′N, 68°45′E, 1995, N. V. Vekhov, polar desert.
- Ledianaia Gavan' Bay, Northern Island, 76°15′N, 68°05′E, 1995, N. V. Vekhov, A. N. Kuliev, polar desert.
- Litke Bay, Southern Island, 72°24′N, 55°18′E, 1996, N. V. Vekhov, arctic tundra.
- Mashigina Bay, Northern Island, c. 74°48′N, 56°06′E, 1921, B. Lynge, arctic tundra.
- Matochkin Shar Strait, c. 73°20′N, 55°20′E, 1921, B. Lynge, arctic tundra.
- Russkaia Gavan' Bay, near the polar station, Northern Island, 76°14′N, 62°39′E, 1997, V. P. Shevchenko, arctic tundra.

NENETS AUTONOMOUS AREA (61 species documented)

- Bol'shaia Talata River, IUgorskiĭ Peninsula, 69°05′N, 61°05′E, 2008, I. A. Lavrinenko, typical tundra.
- Bol'shoĭ TSinkovyĭ Island, between Barents and Kara Seas, 70°27′N, 58°40′E, 1997, V. P. Shevchenko, arctic tundra.
- Cape Bolvanskiĭ Nos, Bol'shezemel'skaia Tundra, 68°18′N, 54°30′E, 1999, O. V. Lavrinenko, typical tundra.
- Dolgaia Bay, Vaĭgach Island in the Kara Sea, 70°16′N, 58°40′E, 1997, N. V. Vekhov; 1998, V. P. Shevchenko; arctic tundra.
- Dolgiĭ Island, Barents Sea, 69°12–22′N, 58°45'–59°15′E, 1998, V. P. Shevchenko; 2005, O. V. Lavrinenko; typical tundra.
- IAmboto Lake, 68°05′N, 61°15′E, 1998, A. A. Kustysheva, southern tundra.
- Khabuĭkato Lake, 68°32′N, 53°51′E, 1999, O. V. Lavrinenko, typical tundra.
- Khar'iaga oilfield, 67°11′N, 56°30′E, 2007, M. P. Zhurbenko, southern tundra.
- Matveev Island, Barents Sea, 69°28′N, 58°30′E, 2005, O. V. Lavrinenko, typical tundra.
- Nenets Ridge, 68°19′N, 53°08′E, 1998, O. V. Lavrinenko, southern tundra.
- Ortina River, 67°47′N, 54°08′E, 1999, O. V. Lavrinenko, southern tundra.
- Pechora River in its lower reaches, 68°03′N, 54°00′E, 1999, O. V. Lavrinenko, southern tundra.
- Peschanka River near Peschanka-To Lake, 68°46′N, 53°10′E, 1997, 1998, O. V. Lavrinenko, typical tundra.
- Seduiakha River, 68°23′N, 53°15′E, 1998, O. V. Lavrinenko, southern tundra.
- Severnaia River at its headwaters, 67°38′N, 54°01′E, 1996, O. V. Lavrinenko, forest tundra.

KOMI REPUBLIC (9 species documented)

- Elets River near the 61st km of the Vorkuta-Labytnangi railway line, 67°02′N, 64°26′E, 1993, M. P. Zhurbenko, southern tundra.
- Paga River, 35 km SNE of Sivaĭa Maska, 66°22′N, 66°52′E, 2007, J. Hermansson, forest tundra.

YAMAL-NENETS AUTONOMOUS AREA (58 species documented)

- Baĭdaratskaĭa Bay coast east of Ngoiuiakha River mouth, 68°46–51′N, 66°43–56′E, 2007, I. S. Zhdanov, typical tundra.
- Baĭdaratskaĭa Bay coast near IAraiakha River mouth, 69°16′N, 68°09′E, 2007, I. S. Zhdanov, typical tundra.
- Belyĭ Island in the Kara Sea, near the polar station, 73°18′N, 70°08′E, 2009, D. A. Walker, arctic tundra.
- Bovanenkovo settlement, Yamal Peninsula, 70°18′N, 68°50′E, 2007, D. A. Walker, typical tundra.
- Chugor'iakha River, Gydan Peninsula, 69°07′N, 74°45′E, 1991, M. P. Andreev, typical tundra.
- IAmburg (IAnburg ?) factoria at the mouth of the Piako-YUn River, Taz Peninsula, probably 68°22′N, 77°13′E, 1931, N. Mochalov, southern tundra.
- Kharasavėĭ settlement, Yamal Peninsula, 71°11′N, 66°59′E, 2008, D. A. Walker, typical tundra.
- Khasseinto-Se River, Gydan Peninsula, 70°57′N, 79°09′E, 1927, B. N. Gorodkov, typical tundra.
- Laborovaia settlement, Yamal Peninsula, 67°42′N, 68°02′E, 2007, D. A. Walker, southern tundra.

- Neromaiakha River, Yamal Peninsula, 70°10′N, 69°10′E, 1990, O. V. Rebristaia, O. V. Khitun, typical tundra.
- Mount Rai-Iz, Polar Ural Mountains, 67°00′N, 65°30′E, 1993, M. P. Zhurbenko; 2004, S. S. Kholod; (northern taiga)–mountain tundra.
- Obskaia Region of Labytnangi town, 66°45′N, 66°15′E, 1995, O. I. Sumina, forest tundra.
- Saletaiakha River, Yamal Peninsula, 69°45′N, 68°40′E, 1990, O. V. Khitun, O. V. Rebristaya, typical tundra.
- Sob' River near the 129th km of the Vorkuta-Labytnangi railway line, Polar Ural Mountains, 67°00′N, 65°45′E, 1986, 1993, M. P. Zhurbenko, (northern taiga)–mountain tundra.

KRASNOYARSK TERRITORY (200 species documented)

- Dikson Island, Kara Sea, 73°30′N, 80°20′E, 1990, M. P. Zhurbenko, arctic tundra.
- Geiberg Islands, Kara Sea, c. 77°38′N, 101°31′E, 1951, Musina, polar desert.
- Leskino settlement on the coast of the Eniseĭ Bay, Gydan Peninsula, 72°20′N, 79°30′E, 1972, R. I. YUnak and G. I. Prokop'eva, typical tundra.
- Ptichiĭ Island in the Piasinskiĭ Bay of the Kara Sea, 74°07′N, 86°35′E, 1993, V. B. Kuvaev, arctic tundra.
- Russkiĭ Island, Nordenshel'da Archipelago, Kara Sea, 77°03′N, 96°00′E, 1993, M. V. Melnikov, arctic tundra.
- Sibiriakova Island, Kara Sea, 72°55′N, 79°10′E, 1989, 1990, A. D. Kozhevnikova, V. B. Kuvaev, typical tundra.
- Sverdrupa Island, Kara Sea, 74°33′N, 79°25′E, 1992, YU. P. Kozhevnikov, arctic tundra.
- Troĭnoĭ Island, Izvestiĭ TSIK Islands, Kara Sea, 75°57′N, 82°56′E, 1992, YU. P. Kozhevnikov, arctic tundra.
- Vize Island, Kara Sea, 79°30′N, 76°54′E, 1930, V. P. Savicz, polar desert.

PUTORANA PLATEAU (59 species documented)

- northern shore of Aian Lake, 69°19′N, 93°33′E, 1984, M. P. Zhurbenko, (northern taiga)–mountain tundra.
- southern shore of Aian Lake, 69°00′N, 94°06′E, 1984, M. P. Zhurbenko, (northern taiga)–mountain tundra.
- Bunisiak River mouth at the eastern end of Lama Lake, 69°23′N, 91°36′E, 1984, M. P. Zhurbenko, (northern taiga)–mountain tundra.
- Kapchuk Lake, 69°29′N, 91°00′E, 1982, A. N. Titov; 1983, 1985, M. P. Zhurbenko; (northern taiga)–mountain tundra.
- Mount Kholokit, 69°10′N, 94°40′E, 1967, N. V. Lovelius, (northern taiga)–mountain tundra.
- Sobach'e (Yt-Kiuėl') Lake, 69°08′N, 91°55′E, 1996, L. L. Zanokha, N. V. Matveeva, (northern taiga)–mountain tundra.
- east of Talnakh district of Noril'sk city, 69°28′N, 88°36′E, 1985, M. P. Zhurbenko, (northern taiga)–mountain tundra.

SEVERNAYA ZEMLYA ARCHIPELAGO (85 species documented)

- Srednii Island, Sedova (Sergeia Kameneva) Archipelago, 79°25′N, 91°40′E, 1930, V. P. Savicz; 1979, E. A. Khodachek; polar desert.

BOL'SHEVIK ISLAND

- Akhmatova Bay, 79°04′N, 102°41–45′E, 1996, M. P. Zhurbenko, polar desert.
- Cape Antseva, 78°13′N, 103°15′E, 1997, 1998, 2000, N. V. Matveeva, polar desert.
- Cape Baranova, near the polar station, 79°17′N, 101°38′E, 1996, M. P. Zhurbenko, polar desert.
- Golysheva River, 78°26′N, 104°28′E, 2000, N. V. Matveeva, polar desert.
- Mikoiana Bay, 79°18′N, 101°55′E, 1996, M. P. Zhurbenko, polar desert.
- Ostantsovaia River, 79°13′N, 102°02′E, 1996, M. P. Zhurbenko, polar desert.
- Mount Ostraia near Mushketova Glacier, 79°11′N, 102°09′E, 1996, M. P. Zhurbenko, polar desert.
- Predgornoe Lake, 79°07′N, 102°31′E, 1992, YU. V. Kotlov, polar desert.

- Skalistaia River, 78°15′N, 103°30′E, 1998, N. V. Matveeva, polar desert.
- Studënaia River, 78°37′N, 101°05′E, 1998, N. V. Matveeva, polar desert.

OKTIABR'SKOĬ REVOLYUTSII ISLAND

- Cape Figurnyĭ (Nillender) in front of Matusevicha Bay, 80°03′N, 98°35′E, 1931, G. A. Ushakov, polar desert.
- Goluboe Lake, 79°47′N, 97°34′E, 1985, M. V. Gavrilo, polar desert.
- Krasnaia Bay, 79°42′N, 96°40′E, 1985, M. V. Gavrilo, polar desert.
- Cape Massivnyĭ, 78°49′N, 99°29′E, 2007, M. V. Gavrilo, polar desert.
- Cape Nekrasova, 80°02′N, 99°19′E, 2007, M. V. Gavrilo, polar desert.
- Cape Oloviannyĭ, 78°56′N, 99°59′E, 1931, G. A. Ushakov, polar desert.
- Parizhskoĭ Kommuny Peninsula, 79°33′N, 93°30′E, 1985, M. V. Gavrilo, polar desert.
- Peschanaia River, 79°39′N, 94°00′E, 1985, M. V. Gavrilo, polar desert.
- Mount Serp i Molot, 79°45′N, 94°11′E, 1985, M. V. Gavrilo, polar desert.
- Skazochnaia Bay, 79°45′N, 97°00′E, 1985, M. V. Gavrilo, polar desert.
- Cape Vatutina, 79°26′N, 93°53′E, 1979, E. A. Khodachek, polar desert.

TAYMYR PENINSULA (167 species documented)

- Aia-Turku Lake, 73°50′N, 92°10′E, 1975, M. V. Sokolova, typical tundra.
- Bikada River, 74°50′N, 106°10′E, 1989, 1998, E. B. Pospelova, typical tundra.
- Bol'shaia Bootankaga River near its confluence with the Levli River, Byrranga Mountains, 74°20′N, 98°05′E, 1991, V. B. Kuvaev, typical tundra.
- Cape Cheliuskina, 77°43′N, 104°15′E, 1974, N. V. Matveeva, polar desert.
- Dudinka town, 69°24′N, 86°10′E, 1876, M. Brenner, forest tundra.
- Khatanga settlement, 71°58′N, 102°27′E, 1995, M. P. Zhurbenko, forest tundra.
- Cape Kosistyĭ in the Khatanga Bay, 73°39′N, 109°43′E, 1996, I. YU. Kirtsideli, typical tundra.
- Kotuĭ River, 71°24′N, 103°00′E, 1997, M. Nissen, forest tundra.
- Krasnaia River, north of Levinson-Lessinga Lake, Byrranga Mountains, 74°35′N, 98°15′E, 1994, 1995, M. P. Zhurbenko, typical tundra.
- Krasnoe Lake near Bol'shaia Bootankaga River, Byrranga Mountains, 74°31′N, 97°50′E, 1991, V. B. Kuvaev; 1995, M. P. Zhurbenko; typical tundra.
- eastern shore of Levinson-Lessinga Lake, Byrranga Mountains, 74°29′N, 98°39′E, 1995, M. P. Zhurbenko, typical tundra.
- northern shore of Levinson-Lessinga Lake, Byrranga Mountains, 74°32′N, 98°36′E, 1994, 1995, M. P. Zhurbenko, typical tundra.
- southern shore of Levinson-Lessinga Lake, Byrranga Mountains, 74°25′N, 98°46′E, 1994, 1995, M. P. Zhurbenko, typical tundra.
- western shore of Levinson-Lessinga Lake, Byrranga Mountains, 74°29′N, 98°33′E, 1994, 1995, M. P. Zhurbenko, typical tundra.
- Malaia Balakhnia River mouth, 72°46′N, 105°08′E, 1996, I .YU. Kirtsideli, forest tundra.
- Nikandrovskie Islands in the Eniseĭ River delta, 70°48′N, 83°15′E, 1876, M. Brenner, typical tundra.
- Oboĭnoe settlement, 72°27′N, 104°10′E, 1996, I. YU. Kirtsideli, forest tundra.
- Osipovka River in its lower reaches, 72°42′N, 80°51′E, 1990, M. P. Zhurbenko, typical tundra.
- Piasina River mouth, 74°08′N, 86°44′E, 1993, V. B. Kuvaev, arctic tundra.
- north-west of Piasino Lake, N'iapan Ridge, 70°00′N, 87°30′E, 1983, M. P. Zhurbenko; 1999, L. L. Zanokha; southern tundra.
- Polovinka, 68°15′N, 1876, M. Brenner; the exact location and zonal affiliation are unclear, probably northern taiga or forest tundra (Heuchert & Braun 2014).
- Pravaia Uboĭnaia River near its confluence with the Uboĭnaia River, 73°25–26′N, 82°43–51′E, 1990, M. P. Zhurbenko, arctic tundra.
- Ragozinka River in its lower reaches, 72°48′N, 80°53′E, 1990, M. P. Zhurbenko, typical tundra.
- Syrutaturku Lake, 73°42′N, 97°40′E, 1994, E. B. Pospelova, typical tundra.

- Tareia settlement, 73°20′N, 90°36′E, 1965, N. V. Matveeva, typical tundra.
- Tolstyĭ Nos settlement (abandoned), 70°04′N, 82°53′E, 1876, M. Brenner, southern tundra.
- Uboĭnaia River mouth, 73°36–39′N, 82°22′E, 1990, M. P. Zhurbenko, arctic tundra.

REPUBLIC OF SAKHA (YAKUTIA) (110 species documented)

- Ambarchik settlement in the Kolyma River delta, 69°37′N, 162°17′E, 2002, D. A. Walker, typical tundra.
- Amerika-Khaia hill, Bol'shaia Tumatskaia Channel of the Lena River delta, 72°35′N, 126°18′E, 1998, YU. M. Cherkasova, M. P. Zhurbenko, typical tundra.
- Belaia Strelka Ridge, 60 km E of Cherskii settlement, 68°40′N, 162°40′E, 1975, A. Egorova, southern tundra–forest tundra.
- Bulunkan-Khaiata Tract, Kharaulakh Ridge, 72°17′N, 127°45′E, 1988, I. I. Makarova, typical tundra.
- Chaĭ-Tumus cabin in the Lena River delta, 72°20′N, 125°46′E, 1998, M. P. Zhurbenko, typical tundra.
- Cherskiĭ settlement in the lower Kolyma River, 68°45′N, 161°20′E, 2002, D. A. Walker, southern tundra–forest tundra.
- Khaia-YUriakh Tract, Chekanovskogo Range between the lower reaches of the Olenek and Lena Rivers, 72°22′N, 123°04′E, 2000, G. Grosse, typical tundra.
- Khas-Khatyn-Dzhiete cabin in the Lena River delta, 72°50′N, 126°15′E, 1987, V. I. Perfil'eva, typical tundra.
- Cape Krest-Tumsa in the Lena River delta, 72°22′N, 126°42′E, 1987, V. I. Perfil'eva; 1998, M. P. Zhurbenko; typical tundra.
- Kunga Ridge, 71°16′N, 129°22′E, 2000, V. V. Kunitskiĭ, typical tundra.
- Kurungnaakh-Sise Island in the Lena River delta, 72°20′N, 126°18′E, 1998, M. P. Zhurbenko, typical tundra.
- Pokhodskoe settlement in the Kolyma River delta, 69°04′N, 160°57′E, 1905, I. Shul'ga, southern tundra.
- Samoĭlovskiĭ (D'iėlėėkh Aryta) Island in the Lena River delta, 72°22′N, 126°29′E, 1988, I. I. Makarova; 1998, M. P. Zhurbenko; typical tundra.
- Stolb (Ėbė-Khaĭia) Island in the Lena River delta, 72°24′N, 126°40′E, 1998, M. P. Zhurbenko, typical tundra.
- Tas-Ary Island in the lower Lena River, 71°50′N, 127°20′E, 1988, I. I. Makarova, southern tundra.
- Tiksi settlement, 71°38′N, 128°52′E, 1998, M. P. Zhurbenko; 2000, V. V. Kunitskiĭ; typical tundra.
- Tit-Ary Island in the lower Lena River, 71°59′N, 127°03′E, 1998, M. P. Zhurbenko, forest tundra.
- Yrbalakh-Aryta Island in the Lena River delta, 72°24′N, 126°30′E, 1997, YU. M. Cherkasova, typical tundra.
- YUryung-Kysam Tract opposite Tit-Ary Island in the lower Lena River, 71°59′N, 127°14′E, 1988, I. I. Makarova; 1997, YU. M. Cherkasova; 1998, M. P. Zhurbenko; typical tundra.

NEW SIBERIAN ISLANDS (18 species documented)

- Bel'kovskiĭ Island, 75°33′N, 135°50′E, 1994, J.-E. Mattsson, arctic tundra.
- Bennetta Island, 76°41′N, 148°43′E, 1989, M. P. Zhurbenko, polar desert.
- Kotel'nyĭ Island, Balyktakh River in its middle reaches, 75°15′N, 140°00′E, 1965, O. V. Egorov, arctic tundra.
- Kotel'nyĭ Island, Evsekiu-Bulgunniakh Upland on Bunge Land, 75°30′N, 139°00′E, 1980, V. I. Perfil'eva, arctic tundra.
- Kotel'nyĭ Island, Kotel'nyĭ Island settlement, 75°49′N, 137°42′E, 1947, B. N. Gorodkov, arctic tundra.
- Zhokhova Island, 76°09′N, 152°43′E, 1989, M. B. Samarskii, polar desert.

CHUKOTKA AUTONOMOUS AREA (162 species documented)

- Amguema River at the 174th km of the Ėgvekinot-Iul'tin road, 67°41′N, 178°35′W, 1979, I. I. Makarova, typical tundra.
- Aniuĭskiĭ volcano, Aniuĭskiĭ Ridge, 67°10′N, 166°20′E, 1982, M. P. Andreev, (northern taiga)–mountain tundra.
- Baran'e Lake, northern part of the Pekul'neĭ Ridge, 66°51′N, 175°20′E, 1980, I. I. Makarova, southern tundra.
- Baranikha settlement (abandoned) in the middle course of the Rau-Chua River, 68°33′N, 168°12′E, 1967, E. V. Zimarskaya, I. I. Makarova, B. A. Yurtsev; 1971, A. V. Galanin, I. I. Makarova; typical–southern tundra.
- Bezymiannoe Lake, 66°38′N, 176°41′E, 1979, I. I. Makarova, southern tundra.
- Bol'shoĭ Aniuĭ River in its lower reaches, 1951, V. N. Andreev, forest tundra.
- Bol'shoĭ Peledon River at its headwaters, c. 66°15′N, 168°00′E, 1982, M. P. Andreev, (northern taiga)–mountain tundra.
- Bol'shoĭ Routan Island in the Chaunskaia Bay of the East Siberian Sea, 69°45′N, 170°08′E, 1968, B. A. Yurtsev, typical tundra.
- Chaplinskie hot springs, 64°25′N, 172°30′W, 1957, V. A. Gavriliuk, P. K. Gagarin, typical tundra.
- Chegitun' River at its confluence with the Vetgyvaam River, 66°28′N, 171°12′W, 1991, I. I. Makarova, B. A. Yurtsev, typical tundra.
- Chegitun' River at its confluence with the Khesmymken River, 66°20′N, 171°48′W, 1982, A. E. Katenin, typical tundra.
- Ėgvekinot settlement in Kresta Bay, 66°20′N, 179°07′W, 1951, Berezina; 1967, B. A. Yurtsev; 1970, I. I. Makarova; typical tundra.
- 36th km of the Ėgvekinot-Iul'tin road, 66°35′N, 179°10′E, 1971, I. I. Makarova, typical tundra.
- Mount Ėlombal near the Malyĭ Aniuĭ River, c. 67°35′N, 166°20′E, 1977, M. P. Andreev, forest tundra–mountain tundra.
- Ėlvineĭveem River, Aniuĭ Upland, 1967, B. A. Yurtsev; the exact location and zonal affiliation are unclear.
- Ėnmil'veergin River at its headwaters, 1951, Ababkov; the exact location and zonal affiliation are unclear.
- Ėnmyvaam River in its middle reaches near the mouth of the Shustraia River, 68°15′N, 166°03′E, 1980, I. I. Makarova, typical tundra.
- Ėnurmino settlement, 66°56′N, 171°49′W, 1972, I. I. Makarova, typical tundra.
- Ėrguveem River at its confluence with the Vatamkaĭvaam and Pepenveem Rivers, 65°55′N, 175°50′W, 1967, E. V. Zimarskaia; 1970, A. V. Galanin, B. A. Yurtsev, I. I. Makarova; typical tundra.
- Gil'mymlineĭveem River near the hot springs, 65°48′N, 173°15′W, 1977, I. I. Makarova, typical tundra.
- Mount Gil'mymlineĭ, 65°53′N, 173°44′W, 1977, I. I. Makarova, typical tundra.
- IAnrakynnot settlement, 64°53′N, 172°30′W, 1976, A. K. Sytin; 1978, N. A. Sekretareva; 1986, A. E. Katenin; typical tundra.
- Inakhpak (Novoe Chaplino) settlement, 64°34′N, 172°38′W, 2001, M. P. Zhurbenko, typical tundra.
- Inchoun settlement, 66°17′N, 170°17′W, 1975, I. I. Makarova, typical tundra.
- Innepinkul'veem River, 1951, Ababkov; the exact location and zonal affiliation are unclear.
- Ioni Lake, 65°53′N, 173°44′W, 1977, I. I. Makarova, typical tundra.
- Iskaten' Ridge at the 32nd km of the Ėgvekinot-Iul'tin road, 66°35′N, 179°10′W, 1967, T. Voronova; 1971, A. E. Katenin, V. A. Kostina, I. I. Makarova; typical tundra.
- Iul'tin settlement, 67°52′N, 178°45′W, 1967, unknown collector; 1970, I. I. Makarova; typical tundra.
- Kaneliveem River, 69°19′N, 164°20′E, 1977, V. V. Petrovskiĭ, typical tundra.
- Karval'ianskaia River in its middle reaches, 65°55′N, 170°00′E, 1982, O. M. Afonina, (*Pinus pumila* thickets)–mountain tundra.
- Koliuchin Island in the Chukchi Sea, 67°26′N, 174°36′W, 1965, 1969, T. V. Plieva, typical tundra.

- Koliuchinskaia Bay coast north of Cape Anaian, 66°40′N, 173°54′W, 1980, M. P. Zhurbenko, A. E. Katenin, typical tundra.
- Kurupka River, 64°45′N, 174°05′W, 1987, A. E. Katenin, typical tundra.
- Kymyneĭveem River, 67°26′N, 175°25′W, 1989, A. E. Katenin, typical tundra.
- Kytep-Guiten'ryveem River, 69°21′N, 164°49′E, 1977, V. V. Petrovskiĭ, typical tundra.
- Lavrentiia settlement in Lavrentiia Bay, 65°35′N, 170°59′W, 1969, unknown collector; 1972, 1973, 1975, I. I. Makarova, typical tundra.
- Loren River at its headwaters, 65°40′N, 171°50′W, 1972, I. I. Makarova, typical tundra.
- Lorino settlement, 65°29′N, 171°43′W, 1972, I. I. Makarova, typical tundra.
- Mount Malyĭ Arėnaĭ near Arėnaĭ Lagoon, 62°41′N, 179°21′E, 2012, D. S. Lysenko, typical–southern tundra.
- Mil'kera River at its headwaters, 69°13′N, 165°12′E, 1977, M. P. Andreev, typical tundra.
- Mount Nauneson at the 115th km of the Ėgvekinot-Iul'tin road, 67°15′N, 178°40′W, 1970, A. E. Katenin, typical tundra.
- Niuniamuveem River, 65°20′N, 175°34′W, 1985, A. E. Katenin, typical tundra.
- Ottaĭpytgyn River at its headwaters, Aniuĭskiĭ Ridge, 1952, D. Baikova; the exact location and zonal affiliation are unclear.
- Paliavaam settlement in the middle course of the Paliavaam River, 68°44′N, 173°50′E, 1980, T. G. Polozova, B. A. Yurtsev, typical tundra.
- Penkigneĭ (Konyam) Bay coast at the mouth of the Pestsovaia River, 64°50′N, 173°10′W, 1978, A. E. Katenin, N. V. Usenko, typical tundra.
- Penkigneĭ (Konyam) Bay coast north of YAnrakynnot settlement, 64°55′N, 172°22′W, 1879, E. Almquist, typical tundra.
- Pepenveem River near Ruddera Bay, 65°55′N, 175°50′W, 1970, A. V. Galanin, I. I. Makarova, typical tundra.
- Pitlekaĭ settlement (abandoned), 67°05′N, 173°23′W, 1878–79, E. Almquist, typical tundra.
- Pineĭveem River, 68°35′N, 169°30′E, 1982, T. G. Polozova, typical tundra.
- Provideniia settlement, 64°267′N, 173°13′W, 1969, O. M. Afonina, Safronov; 2001, M. P. Zhurbenko; typical tundra.
- Puoten River mouth north of Lavrentiia Bay, 65°50′N, 170°32′W, 1972, I. I. Makarova, typical tundra.
- Mount Pynei, 45 km WSW of Ust'-Chauna, 68°33′N, 169°30′E, 1951, I. Shmorunova, typical tundra.
- Ratmanova Island in the Bering Strait, 65°47′N, 169°03′W, 1958, B. A. Tikhomirov, typical tundra.
- Mount Razdel'naia on the Aniuĭ Plateau, 68°30′N, 165°00′E, 1977, M. P. Andreev, southern tundra.
- Mount Rėuneĭ, 66°22′N, 171°13′W, 1938, A. A. Trushkovskiĭ, typical tundra.
- Cape Schmidta, 68°55′N, 179°27′E, 1981, N. Laanetu, typical tundra.
- Sireniki settlement, 64°25′N, 173°57′W, 1983, I. I. Makarova; 1984, 1986, A. E. Katenin; typical tundra.
- Taniurer River at its headwaters, c. 66°30′N, 175°50′E, 1943, M. N. Avramchik, southern tundra.
- Televeem River, 65°50′N, 175°05′E, 1979, I. I. Makarova, southern tundra.
- Uelen settlement, 66°20′N, 169°55′W, 1938, A. A. Trushkovskiĭ; 1974, L. S. Blagodatskikh; 1975, I. I. Makarova; typical tundra.
- Utaveem River south of Inchon settlement, 66°16′N, 170°48′W, 1991, A. E. Katenin, typical tundra.
- Utesiki settlement on the Utesiki River, Anadyr' River basin, 65°09′N, 173°36′E, 1948, M. N. Avramchik, (*Pinus pumila* thickets)–mountain tundra.
- Vel'ma (?) River, 1939, A. A. Trushkovskiĭ; the exact location and zonal affiliation are unclear.
- Vesnovannaia River, 65°20′N, 174°26′E, 1950, M. N. Avramchik; 1980, I. I. Makarova; (*Pinus pumila* thickets)–mountain tundra.

WRANGEL ISLAND (55 species documented)

- Gnilaia River at its headwaters, 71°25′N, 178°20′W, 1998, S. S. Kholod, arctic tundra.
- Gusinaia River in its lower reaches, 71°08′N, 179°10′E, 1979, T. G. Polozova; 1991, S. S. Kholod, V. Shtrik; arctic tundra.
- Klark River in its middle reaches, 71°08′N, 178°16′W, 1986, A. A. Dobrysh; 1998, S. S. Kholod; arctic tundra.
- Komsomol Lake, 71°16′N, 179°15′E, 1991, S. S. Kholod, V. Shtrik, arctic tundra.
- Krasnyĭ Flag River, c. 71°30′N, 178°55′W, 1938, B. N. Gorodkov; 1997, S. S. Kholod; arctic tundra.
- Kulikovyĭ Brook, tributary of the Neozhidannaia River, 70°58′N, 179°00′E, 1992, S. S. Kholod, arctic tundra.
- Mamontovaia River in its middle reaches, 71°06′N, 179°50′W, 1995, S. S. Kholod, arctic tundra.
- Naskhok River, 71°24′N, 178°08′W, 1998, S. S. Kholod, arctic tundra.
- Neizvestnaia River at its headwaters, 71°13′N, 179°40′W, 1987, B. A. Yurtsev, S. S. Kholod, arctic tundra.
- Neizvestnaia River in its middle reaches, 71°20′N, 179°29′W, 1986, A. A. Dobrysh; 1995, 1996, S. S. Kholod; arctic tundra.
- Neozhidannaia River, 71°01′N, 179°08′E, 1992, S. S. Kholod, arctic tundra.
- Pravaia Gusinaia River at its headwaters, 71°13′N, 179°15′E, 1991, V. Shtrik; 1996, S. S. Kholod; arctic tundra.
- Cape Ptichiĭ Bazar southwest of the Gusinaia River mouth, 71°08′N, 178°49′E, 1991, S. S. Kholod; 2020, G. S. Evdokimov; arctic tundra.
- Somnitel'naia River, 70°58′N, 179°35′W, 1985, B. A. Yurtsev; 1986, T. G. Polozova; arctic tundra.
- Sovetskaia River, 71°08′N, 178°55′E, 1991, S. S. Kholod, V. Shtrik, arctic tundra.
- Tundrovaia River in its middle reaches, 71°16′N, 179°54′W, 1995, S. S. Kholod, arctic tundra.
- Tundrovaia River in its lower reaches, 71°30′N, 179°45′W, 1996, S. S. Kholod, arctic tundra.
- Ushakovskoe settlement in Rogers Bay, 71°00′N, 178°25′W, 1938, B. N. Gorodkov; 1972, V. V. Mazing; 1987, T. G. Polozova; arctic tundra.
- Verkhniaia Mamontovaia River, 71°14′N, 179°35′E, 1996, S. S. Kholod, arctic tundra.
- Wulfson Lagoon, 71°28′N, 178°13′W, 1998, S. S. Kholod, arctic tundra.
- Zapadnoe Plateau, 71°02′N, 179°01′E, 1992, S. S. Kholod, arctic tundra.

APPENDIX 2 – REGIONAL ACTIVITY OF LICHENICOLOUS FUNGI IN THE RUSSIAN META-ARCTIC

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Abrothallus bertianus	1/1	1/1	1/1	3	low-active
Abrothallus caerulescens	1/1	1/1	1/1	3	low-active
Abrothallus cladoniae s. lat.	1/1	1/1	1/1	3	low-active
Abrothallus lobariae	1/1	1/1	1/1	3	low-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Abrothallus parmeliarum	20/3	5/3	3/2	8	medium-active
Abrothallus psoromatis	5/2	3/2	1/1	5	low-active
Abrothallus suecicus	1/1	1/1	1/1	3	low-active
Acanthonitschkea peltigericola	1/1	1/1	1/1	3	low-active
Acaroconium lavrinenkoae	1/1	1/1	1/1	3	low-active
Adelococcus alpestris	1/1	1/1	1/1	3	low-active
Adelococcus immersus	2/1	1/1	1/1	3	low-active
Arthonia almquistii	1/1	1/1	1/1	3	low-active
Arthonia apotheciorum	2/1	1/1	1/1	3	low-active
Arthonia cf. *lepidophila*	1/1	1/1	1/1	3	low-active
Arthonia clemens	4/2	2/1	2/1	4	low-active
Arthonia digitatae	18/3	4/2	1/1	6	medium-active
Arthonia epimela	1/1	1/1	1/1	3	low-active
Arthonia epiphyscia	9/2	5/3	2/1	6	medium-active
Arthonia fuscopurpurea	5/2	2/1	2/1	4	low-active
Arthonia molendoi	11/3	4/2	3/2	7	medium-active
Arthonia obscurior	1/1	1/1	1/1	3	low-active
Arthonia pannariae	29/4	3/2	2/1	7	medium-active
Arthonia peltigerea	3/1	3/2	1/1	4	low-active
Arthonia peltigerina	39/4	4/2	2/1	7	medium-active
Arthonia stereocaulina	48/4	6/3	1/1	8	medium-active
Arthonia triebeliae	2/1	1/1	2/1	3	low-active
Arthonia varians	4/2	3/2	1/1	5	low-active
Arthophacopsis parmeliarum	2/1	1/1	1/1	3	low-active
Bachmanniomyces punctum	13/3	5/3	1/1	7	medium-active
Baliomyces taimyricus	1/1	1/1	1/1	3	low-active
Briancoppinsia cytospora	1/1	1/1	1/1	3	low-active
Bryostigma excentricum	30/4	5/3	1/1	8	medium-active
Capronia thamnoliae	3/1	1/1	1/1	3	low-active
Carbonea aggregantula	10/3	4/2	1/1	6	medium-active
Carbonea supersparsa	9/2	3/2	2/1	5	low-active

Taxon	Number of occurrences /score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Carbonea vitellinaria	33/4	6/3	3/2	9	medium-active
Catillaria stereocaulorum	117/5	7/4	1/1	10	highly-active
Cecidonia umbonella	2/1	1/1	1/1	3	low-active
Cecidonia xenophana	1/1	1/1	1/1	3	low-active
Cercidospora decolorella	7/2	3/2	3/2	6	medium-active
Cercidospora epipolytropa	14/3	5/3	1/1	7	medium-active
Cercidospora epithamnolia	5/2	2/1	1/1	4	low-active
Cercidospora lecidomae	8/2	2/1	2/1	4	low-active
Cercidospora lobothalliae	3/1	1/1	1/1	3	low-active
Cercidospora ochrolechiae	23/3	5/3	2/1	7	medium-active
Cercidospora parva	8/2	2/1	1/1	4	low-active
Cercidospora punctillata	78/4	6/3	14/4	11	highly-active
Cercidospora soror	2/1	1/1	1/1	3	low-active
Cercidospora stereocaulorum	74/4	7/4	1/1	9	medium-active
Cercidospora thamnoliae	16/3	4/2	1/1	6	medium-active
Cercidospora thamnoliicola	2/1	2/1	1/1	3	low-active
Cercidospora trypetheliza	5/2	3/2	1/1	5	low-active
Cercidospora verrucosaria	5/2	2/1	1/1	4	low-active
Cercidospora xanthoriae	2/1	1/1	1/1	3	low-active
Chaenothecopsis parasitaster	1/1	1/1	1/1	3	low-active
Cladophialophora novozhilovii	1/1	1/1	1/1	3	low-active
Cladosporium licheniphilum	1/1	1/1	1/1	3	low-active
Clypeococcum bisporum	2/1	1/1	1/1	3	low-active
Clypeococcum cetrariae	1/1	1/1	1/1	3	low-active
Clypeococcum lenae	1/1	1/1	1/1	3	low-active
Clypeococcum placopsiphilum	1/1	1/1	1/1	3	low-active
Collemopsidium cephalodiorum	3/1	2/1	1/1	3	low-active
Corticifraga fuckelii	5/2	2/1	1/1	4	low-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Corticifraga fusispora	3/1	2/1	1/1	3	low-active
Corticifraga peltigerae	29/4	7/4	2/1	9	medium-active
Corticifraga santessonii	1/1	1/1	1/1	3	low-active
Cryptodiscus cladoniicola	1/1	1/1	1/1	3	low-active
Cryptodiscus epicladonia	5/2	2/1	1/1	4	low-active
Cryptodiscus galaninae	1/1	1/1	1/1	3	low-active
Dacampia engeliana	10/3	5/3	1/1	7	medium-active
Dacampia rufescentis	4/2	2/1	1/1	4	low-active
Dacampia thamnoliicola	1/1	1/1	1/1	3	low-active
Didymellopsis cf. *collematum*	1/1	1/1	1/1	3	low-active
Didymellopsis solorinae	2/1	1/1	1/1	3	low-active
Didymocyrtis bryonthae	13/3	4/2	1/1	6	medium-active
Didymocyrtis consimilis	5/2	2/1	4/2	5	low-active
Didymocyrtis epiphyscia	6/2	2/1	4/2	5	low-active
Didymocyrtis peltigerae	1/1	1/1	1/1	3	low-active
Echinothecium reticulatum	33/4	1/2	2/1	7	medium-active
Endococcus collematis	1/1	1/1	1/1	3	low-active
Endococcus hafellneri	1/1	1/1	1/1	3	low-active
Endococcus nanellus	13/3	5/3	1/1	7	medium-active
Endococcus perpusillus s. lat.	13/3	4/2	2/1	6	medium-active
Endococcus propinquus	15/3	4/2	4/2	7	medium-active
Endococcus rugulosus s. lat.	15/3	4/2	5/3	8	medium-active
Endococcus stigma	1/1	1/1	1/1	3	low-active
Endococcus verrucosus	1/1	1/1	1/1	3	low-active
Epibryon conductrix	4/2	1/1	1/1	4	low-active
Epibryon solorinae	4/2	2/1	1/1	4	low-active
Epicladonia sandstedei	8/2	4/2	1/1	5	low-active
Epicladonia simplex	1/1	1/1	1/1	3	low-active
Epicladonia stenospora	5/2	5/3	1/1	6	medium-active
Epilichen stellatus	1/1	1/1	1/1	3	low-active
Epithamnolia karatyginii	4/2	3/2	1/1	5	low-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Epithamnolia longicladoniae	1/1	1/1	1/1	3	low-active
Epithamnolia pertusariae	1/1	1/1	1/1	3	low-active
Epithamnolia xanthoriae s. lat.	2/1	2/1	2/1	3	low-active
Everniicola flexispora	5/2	3/2	1/1	5	low-active
Geltingia associata	13/3	3/2	2/1	6	medium-active
Graphium aphthosae	8/2	4/2	1/1	5	low-active
Hobsoniopsis santessonii	1/1	1/1	1/1	3	low-active
Homostegia piggotii	1/1	1/1	1/1	3	low-active
Illosporium carneum	12/3	4/2	1/1	6	medium-active
Intralichen lichenicola s. lat.	8/2	4/2	6/3	7	medium-active
Knufia peltigerae	1/1	1/1	1/1	3	low-active
Lasiosphaeriopsis cephalodiorum	1/1	1/1	1/1	3	low-active
Lasiosphaeriopsis pilophori	1/1	1/1	1/1	3	low-active
Lasiosphaeriopsis salisburyi	2/1	2/1	1/1	3	low-active
Lasiosphaeriopsis stereocaulicola	75/4	5/3	1/1	8	medium-active
Lecanographa rinodinae	1/1	1/1	1/1	3	low-active
Lichenochora caloplacae	1/1	1/1	1/1	3	low-active
Lichenochora cf. *polycoccoides*	3/1	1/1	1/1	3	low-active
Lichenochora constrictella	3/1	3/2	1/1	4	low-active
Lichenochora coppinsii s. lat.	10/3	2/1	2/1	5	low-active
Lichenochora elegantis	1/1	1/1	1/1	3	low-active
Lichenochora lepidiotae s. lat.	2/1	1/1	2/1	3	low-active
Lichenochora mediterraneae	1/1	1/1	1/1	3	low-active
Lichenochora rinodinae	12/3	7/4	1/1	8	medium-active
Lichenochora sedelnikoviorum	2/1	1/1	1/1	3	low-active
Lichenochora weillii	3/1	2/1	1/1	3	low-active
Lichenoconium erodens	5/2	3/2	1/1	5	low-active
Lichenoconium lecanorae	38/4	7/4	18/5	13	highly-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Lichenoconium pyxidatae	6/2	4/2	1/1	5	low-active
Lichenoconium usneae	6/2	4/2	5/3	7	medium-active
Lichenoconium xanthoriae	1/1	1/1	1/1	3	low-active
Lichenodiplis lecanorae	3/1	2/1	3/2	4	low-active
Lichenodiplis lichenicola	1/1	1/1	1/1	3	low-active
Lichenopeltella cetrariicola	1/1	1/1	1/1	3	low-active
Lichenopeltella cladoniarum	4/2	3/2	1/1	5	low-active
Lichenopeltella peltigericola	3/1	3/2	1/1	4	low-active
Lichenopeltella stereocaulorum	7/2	3/2	1/1	5	low-active
Lichenopuccinia poeltii	1/1	1/1	1/1	3	low-active
Lichenosticta alcicorniaria	9/2	3/2	1/1	5	low-active
Lichenosticta dombrovskae	2/1	1/1	1/1	3	low-active
Lichenostigma alpinum	46/4	7/4	16/4	12	highly-active
Lichenostigma elongatum	1/1	1/1	1/1	3	low-active
Lichenostigma maureri	20/3	4/2	2/1	6	medium-active
Lichenostigma semiimmersum	1/1	1/1	1/1	3	low-active
Lichenothelia rugosa	2/1	2/1	1/1	3	low-active
Merismatium cf. *peregrinum*	1/1	1/1	1/1	3	low-active
Merismatium coccisporum	9/2	2/1	5/3	6	medium-active
Merismatium decolorans	10/3	4/2	5/3	8	medium-active
Merismatium heterophractum	19/3	4/2	9/4	9	medium-active
Merismatium nigritellum	33/4	7/4	20/5	13	highly-active
Merismatium thamnoliicola	4/2	1/1	1/1	4	low-active
Micarea inquinans	1/1	1/1	1/1	3	low-active
Minutoexcipula tephromelae	1/1	1/1	1/1	3	low-active
Muellerella atricola	4/2	2/1	1/1	4	low-active
Muellerella erratica	41/4	7/4	8/3	11	highly-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Muellerella hospitans	1/1	1/1	1/1	3	low-active
Muellerella lichenicola	26/3	5/3	10/4	10	highly-active
Muellerella pygmaea s. lat.	49/4	4/2	7/3	9	medium-active
Muellerella pygmaea s. str.	11/3	3/2	4/2	7	medium-active
Muellerella ventosicola	17/3	5/3	3/2	8	medium-active
Nanostictis peltigerae	3/1	2/1	1/1	3	low-active
Neoechinodiscus kozhevnikovii	1/1	1/1	1/1	3	low-active
Neolamya ahtii	2/1	2/1	1/1	3	low-active
Neolamya peltigerae	3/1	2/1	1/1	3	low-active
Nesolechia cetrariicola	1/1	1/1	1/1	3	low-active
Nesolechia oxyspora var. *fusca*	2/1	2/1	1/1	3	low-active
Nesolechia oxyspora var. *oxyspora*	14/3	4/2	2/1	6	medium-active
Niesslia cladoniicola	5/2	2/1	1/1	4	low-active
Niesslia keissleri	15/3	4/2	1/1	6	medium-active
Niesslia peltigericola	10/3	2/1	2/1	5	low-active
Nigropuncta rugulosa	2/1	2/1	1/1	3	low-active
Opegrapha geographicola	1/1	1/1	1/1	3	low-active
Opegrapha placidiicola	1/1	1/1	1/1	3	low-active
Opegrapha stereocaulicola	29/4	5/3	1/1	8	medium-active
Pezizella epithallina	1/1	1/1	1/1	3	low-active
Phacopsis cf. *cephalodioides*	1/1	1/1	1/1	3	low-active
Phacopsis vulpicidae	1/1	1/1	1/1	3	low-active
Phaeoseptoria peltigerae	1/1	1/1	1/1	3	low-active
Phaeospora arctica	1/1	1/1	1/1	3	low-active
Phaeospora peltigericola	7/2	2/1	1/1	4	low-active
Phaeospora rimosicola	2/1	2/1	1/1	3	low-active
Plectocarpon linitae	7/2	5/3	1/1	6	medium-active
Polycoccum crassum	2/1	2/1	1/1	3	low-active
Polycoccum pulvinatum	3/1	3/2	1/1	4	low-active
Polycoccum trypethelioides	38/4	6/3	1/1	8	medium-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Polycoccum ventosicola	1/1	1/1	1/1	3	low-active
Polycoccum vermicularium	18/3	5/3	1/1	7	medium-active
Polydesmia lichenis	1/1	1/1	1/1	3	low-active
Pronectria erythrinella	3/1	2/1	1/1	3	low-active
Pronectria loweniae	7/2	3/2	1/1	5	low-active
Pronectria robergei	2/1	1/1	1/1	3	low-active
Pronectria tenuispora	4/2	1/1	1/1	4	low-active
Pronectria walkerorum	6/2	2/1	1/1	4	low-active
Protothelenella santessonii	14/3	4/2	1/1	6	medium-active
Pseudopyrenidium tartaricola	24/3	7/4	1/1	8	medium-active
Pyrenidium actinellum s. lat.	23/3	4/2	3/2	7	medium-active
Raesaenenia huuskonenii	1/1	1/1	1/1	3	low-active
Reconditella physconiarum	1/1	1/1	1/1	3	low-active
Rhagadostoma brevisporum	1/1	1/1	1/1	3	low-active
Rhagadostoma lichenicola	11/3	5/3	1/1	7	medium-active
Rhymbocarpus geographici	2/1	2/1	1/1	3	low-active
Rhymbocarpus makarovae	2/1	1/1	1/1	3	low-active
Rhymbocarpus neglectus	21/3	5/3	1/1	7	medium-active
Rhymbocarpus pertusariae	1/1	1/1	1/1	3	low-active
Rhymbocarpus stereocaulorum	27/3	4/2	1/1	6	medium-active
Roselliniella cladoniae	2/1	2/1	1/1	3	low-active
Roselliniella pannariae	2/1	1/1	1/1	3	low-active
Roselliniopsis gelidaria	1/1	1/1	1/1	3	low-active
Roselliniopsis ventosa	1/1	1/1	1/1	3	low-active
Sagediopsis aspiciliae	4/2	3/2	3/2	6	medium-active
Sagediopsis campsteriana	6/2	4/2	1/1	5	low-active
Sagediopsis pertusariicola	13/3	3/2	1/1	6	medium-active
Sclerococcum ahtii	5/2	2/1	1/1	4	low-active
Sclerococcum amygdalariae	24/3	3/2	1/1	6	medium-active
Sclerococcum athallinum	1/1	1/1	1/1	3	low-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Sclerococcum attendendum	11/3	2/1	1/1	5	low-active
Sclerococcum cf. *aeruginosum*	1/1	1/1	1/1	3	low-active
Sclerococcum deminutum	140/5	7/4	20/5	14	highly-active
Sclerococcum frigidum	4/2	2/1	1/1	4	low-active
Sclerococcum gelidarum	1/1	1/1	1/1	3	low-active
Sclerococcum glaucomarioides	8/2	3/2	2/1	5	low-active
Sclerococcum homoclinellum	1/1	1/1	1/1	3	low-active
Sclerococcum montagnei	1/1	1/1	1/1	3	low-active
Sclerococcum parasiticum	5/2	2/1	5/3	6	medium-active
Sclerococcum pertusariicola	4/2	1/1	1/1	4	low-active
Sclerococcum purpurascens	8/2	2/1	2/1	4	low-active
Sclerococcum rhyparizae	1/1	1/1	1/1	3	low-active
Sclerococcum saxatile	1/1	1/1	1/1	3	low-active
Sclerococcum urceolatum	2/1	2/1	2/1	3	low-active
Sclerococcum zhurbenkoi	13/3	3/2	1/1	6	medium-active
Scutula epiblastematica	1/1	1/1	1/1	3	low-active
Scutula miliaris	2/1	1/1	1/1	3	low-active
Scutula tuberculosa	15/3	4/2	1/1	6	medium-active
Skyttea tephromelarum	1/1	1/1	1/1	3	low-active
Sphaerellothecium abditum	1/1	1/1	1/1	3	low-active
Sphaerellothecium araneosum	17/3	6/3	1/1	7	medium-active
Sphaerellothecium arctoparmeliae	2/1	2/1	1/1	3	low-active
Sphaerellothecium cladoniae	48/4	6/3	1/1	8	medium-active
Sphaerellothecium cladoniicola	16/3	3/2	1/2	6	medium-active
Sphaerellothecium contextum	7/2	3/2	2/1	5	low-active
Sphaerellothecium epilecanora	5/2	3/2	1/1	5	low-active
Sphaerellothecium icmadophilae	1/1	1/1	1/1	3	low-active
Sphaerellothecium minutum	46/4	7/4	1/1	9	medium-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Sphaerellothecium parmeliae	5/2	3/2	1/1	5	low-active
Sphaerellothecium phaeorrhizae	3/1	2/1	1/1	3	low-active
Sphaerellothecium pumilum	11/3	5/3	1/1	7	medium-active
Sphaerellothecium siphulae	13/3	3/2	1/1	6	medium-active
Sphaerellothecium soechtingii	2/1	2/1	1/1	3	low-active
Sphaerellothecium stereocaulorum	3/1	1/1	1/1	3	low-active
Sphaerellothecium taimyricum	13/3	4/2	1/1	6	medium-active
Sphaerellothecium thamnoliae	21/3	5/3	1/1	7	medium-active
Sphaeropezia japewiae	1/1	1/1	1/1	3	low-active
Sphaeropezia santessonii	12/3	4/2	1/1	6	medium-active
Sphaeropezia thamnoliae	8/2	4/2	1/1	5	low-active
Spirographa fusisporella	1/1	1/1	1/1	3	low-active
Stigmidium beringicum	1/1	1/1	1/1	3	low-active
Stigmidium cerinae	8/2	2/1	1/1	4	low-active
Stigmidium cladoniicola	5/2	3/2	1/1	5	low-active
Stigmidium collematis	1/1	1/1	1/1	3	low-active
Stigmidium congestum	1/1	1/1	1/1	3	low-active
Stigmidium conspurcans	39/4	4/2	1/1	7	medium-active
Stigmidium croceae	3/1	2/1	1/1	3	low-active
Stigmidium eucline	1/1	1/1	1/1	3	low-active
Stigmidium frigidum	22/3	3/2	1/1	6	medium-active
Stigmidium gyrophorarum	2/1	1/1	1/1	3	low-active
Stigmidium haesitans	1/1	1/1	1/1	3	low-active
Stigmidium leprariae	1/1	1/1	1/1	3	low-active
Stigmidium microcarpum	9/2	4/2	2/1	5	low-active
Stigmidium mitchellii	16/3	4/2	2/1	6	medium-active
Stigmidium mycobilimbiae	4/2	1/1	1/1	4	low-active
Stigmidium peltideae s. lat.	49/4	4/2	1/1	7	medium-active
Stigmidium pseudopeltideae	5/2	3/2	1/1	5	low-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Stigmidium rivulorum	1/1	1/1	1/1	3	low-active
Stigmidium schaereri s. str.	6/2	3/2	1/1	5	low-active
Stigmidium solorinarium	15/3	5/3	1/1	7	medium-active
Stigmidium squamariae	2/1	1/1	1/1	3	low-active
Stigmidium stereocaulorum	5/2	3/2	1/1	5	low-active
Stigmidium stygnospilum	2/1	1/1	1/1	3	low-active
Stigmidium superpositum	3/1	2/1	1/1	3	low-active
Stigmidium tabacinae	1/1	1/1	1/1	3	low-active
Taeniolella arctoparmeliae	1/1	1/1	1/1	3	low-active
Taeniolella christiansenii	19/3	3/2	1/1	6	medium-active
Taeniolella diederichiana	1/1	1/1	1/1	3	low-active
Taeniolella diploschistis	2/1	2/1	1/1	3	low-active
Taeniolella pertusariicola	4/2	2/1	1/1	4	low-active
Taeniolella rolfii	8/2	5/3	2/1	6	medium-active
Talpapellis beschiana	15/3	4/2	1/1	6	medium-active
Talpapellis peltigerae var. rossica	4/2	3/2	1/1	5	low-active
Tetramelas phaeophysciae	6/2	2/1	2/1	4	low-active
Tetramelas pulverulentus	34/4	4/2	3/2	8	medium-active
Thamnogalla crombiei	20/3	5/3	1/1	7	medium-active
Tremella christiansenii	1/1	1/1	1/1	3	low-active
Trichosphaeria lichenum	2/1	2/1	1/1	3	low-active
Trimmatostroma varicellariae	1/1	1/1	1/1	3	low-active
Unguiculariopsis refractiva	1/1	1/1	1/1	3	low-active
Unguiculariopsis thallophila	1/1	1/1	1/1	3	low-active
Weddellomyces protearius	1/1	1/1	1/1	3	low-active
Xenonectriella lutescens	4/2	2/1	1/1	4	low-active

Taxon	Number of occurrences/score	Number of administrative regions covered/score	Number of host genera infected/score	Total activity score	Activity category
Xenonectriella ornamentata	6/2	3/2	1/1	5	low-active
Zwackhiomyces berengerianus	5/2	2/1	2/1	4	low-active
Zwackhiomyces dispersus	1/1	1/1	1/1	3	low-active
Zwackhiomyces immersae	1/1	1/1	1/1	3	low-active
Zwackhiomyces macrosporus	2/1	1/1	2/1	3	low-active
Zwackhiomyces physciicola	2/1	2/1	1/1	3	low-active
Zwackhiomyces sphinctrinoides	2/1	2/1	1/1	3	low-active
Zyzygomyces bachmannii	9/2	2/1	1/1	4	low-active

Opuscula Philolichenum, **24**: 115–126. 2025.
**pdf effectively published online 26.June.2025 via (http://sweetgum.nybg.org/philolichenum/)*

Some noteworthy lichenicolous fungi on *Lobaria* and *Ricasolia* from the Sakhalin Region of Russia

MIKHAIL P. ZHURBENKO[1]*AND ALEXANDR K. EZHKIN[2]

ABSTRACT. – Specimens tentatively identified as *Plectocarpon lichenum* growing on pevioulsy unreported host species (*Lobaria orientalis*, *L. spathulata*, and *L. tuberculata*) are described and their atypical morphology is discussed. Based on new abundant material, the concept of *P. triebeliae*, here newly reported from Asia and Russia, and newly reported on *Lobaria* species, is refined. Well-developed, conspicuous vegetative hyphae, as well as a presumable synanamorph are noted for the first time for *Verrucoccum coppinsii* agg., a species that is here newly reported for Asia and Russia. Comparison of some diagnostic characters of *Sclerococcum* species growing on Lobariaceae hosts is provided. Asian specimens of *Sclerococcum* growing on *Ricasolia* are well distinguished from *S. ricasoliae* by a thicker basal exciple and larger ascospores. *Stigmidium lobariae* is newly reported from Russia. *Abrothallus lobariae*, *Merismatium lobariae*, *Sclerococcum lobariellum* s. lat., and *Tremella lobariacearum* s. lat. are newly reported from the Sakhalin Region of Russia. *Lobaria orientalis* is reported as a new host species for *Merismatium lobariae* and *Stigmidium lobariae*. *Lobaria meridionalis* and *L. tuberculata* are reported as new host species for *Abrothallus lobariae*. *Lobaria tuberculata* and *Ricasolia japonica* are reported as new host species for *Sclerococcum lobariellum* s. lat.

KEYWORDS. – Biogeography, lichen parasites, Kuril Islands, Lobariaceae, Russian Far East, Sakhalin Island, taxonomy.

INTRODUCTION

Epiphytic macrolichens of the genera *Lobaria* (Schreb.) Hoffm. and *Ricasolia* De Not. (Lobariaceae) are widespread and often abundant in various forest types in the south of the Russian Far East, including the Sakhalin Region of Russia (Chabanenko 2002). While investigating the lichen flora of this region one of us (A. K. Ezhkin) gathered a large collection of lichenicolous fungi growing on these lichens, which were subsequently identified by the first author. According to Diederich et al. (2018), at least 40 species of lichen-dwelling fungi are known on *Lobaria*, making it one of the most 'hospitable' lichen host genera, and at least four species on *Ricasolia*. However, so far there have been only a few publications dealing specifically with the diversity of these fungi on *Lobaria* (e.g., Atienza et al. 2021, Etayo & Diederich 1996, Hawksworth 2005, Kondratyuk & Galloway 1995, Zhurbenko & Etayo 2012). The aim of this work is to provide new information on the taxonomy, host spectra and geography of eight species of lichenicolous fungi growing on the above-mentioned hosts.

MATERIALS AND METHODS

The Sakhalin Region of Russia includes the Sakhalin Island and three Kuril Islands (Iturup, Kunashir, and Shikotan) and is located in the northeastern part of the Pacific Ocean, between Hokkaido

[1]MIKHAIL P. ZHURBENKO – Laboratory of Systematics and Geography of Fungi, Komarov Botanical Institute of the Russian Academy of Sciences, Professor Popov Street 2B, St Petersburg, 197022, Russia. – Email: zhurb58@gmail.com – ORCID: 0000-0002-9839-4698. *corresponding author.
[2]ALEXANDR K. EZHKIN – Laboratory of Plant Ecology and Geoecology, Institute of Marine Geology and Geophysics of the Far Eastern Branch of the Russian Academy of Sciences, Nauki Street 1B, Yuzhno-Sakhalinsk, 693022, Russia. – Email: ezhkin@yandex.ru – ORCID: 0000-0002-2242-2250.

Island (Japan) and Kamchatka Peninsula (Russia). The climate of these islands is temperate, with cold winters and cool rainy summers (Khomenko 2003, Zemtsova 1968). The studied specimens were collected in coniferous, mixed coniferous-broad-leaved and broad-leaved, mainly old-growth forests on bark of *Abies sachalinensis* F. Schmidt, *Acer pictum* Thunb., *Alnus hirsuta* (Spach) Rupr., *Betula ermanii* Cham., *Kalopanax septemlobus* (Thunb.) Koidz., *Magnolia obovata* Thunb., *Picea jezoensis* (Siebold & Zucc.) Carrière, *Quercus crispula* Blume, *Salix caprea* L., *S. udensis* Trautv. & C.A. Mey., *Sorbus commixta* Hedl., *Taxus cuspidata* Siebold et Zucc. ex Endl., and *Ulmus laciniata* (Trautv.) Mayr.

This study is based on 101 specimens of lichenicolous fungi growing on *Lobaria* (98 specimens) and *Ricasolia* (3 specimens) detected during the survey of the neighbourhoods of 19 geographical locations (84 specimens) using standard floristic methodology (Stepanchikova & Gagarina 2014) or when surveying the lichen herbarium of the Institute of Marine Geology and Geophysics in Yuzhno-Sakhalinsk (SAK) (17 specimens from seven locations). The examined specimens are deposited in the mycological herbarium of the V. L. Komarov Botanical Institute in St Petersburg, Russia (LE F) and the SAK herbarium. Additionally, 16 specimens of *Sclerococcum lobariellum* (Nyl.) Ertz & Diederich from LE and UPS herbaria were examined for comparison.

Microscopy was carried out, and images were captured, using a Zeiss Axio Zoom.V16 stereomicroscope fitted with an AxioCam 712 colour digital camera and a Zeiss Axio Imager.A1 compound microscope equipped with Nomarski differential interference contrast optics and fitted with an AxioCam 807 colour digital camera. Microscopic characters were studied using sections hand-cut with a razor blade and mounted in water, 10% potassium hydroxide (K), Lugol's iodine directly (I) or after K pretreatment (K/I), or 50% aqueous solution of nitric acid (N).

Measurements given throughout the text refer to water mounts. When the number of measurements is larger than ten ($n > 10$), dimensions of microstructures, as well as the length/width ratio (l/w) of ascospores and conidia, are given as (min–)($\bar{x}$ − SD) – ($\bar{x}$ + SD)(–max), where min and max are the extreme values observed, $\bar{x}$ the arithmetic mean, and SD the corresponding standard deviation. Dimensions of microstructures, both newly obtained and those taken from the literature, are rounded to the nearest 0.5 µm. Statistical significance of differences in sizes of ascospores was tested with Student's t-test. The measurement of the divergence of the sample distribution from the normal distribution was assessed using the Kolmogorov-Smirnov test of normality. Colours are named according to Kornerup and Wanscher (1978).

THE TAXA

***Abrothallus lobariae* (Diederich & Etayo) Diederich & Ertz**

(≡ *Phoma lobariae* Diederich & Etayo, = *Abrothallus puntilloi* Brackel)

DISCUSSION. – *Phoma lobariae* was described from only an anamorphic state (Etayo & Diederich 1995) while *Abrothallus puntilloi* was described as having both an anamorphic and teleomorphic states (Brackel & Puntillo 2016). They were synonymized by Suija et al. (2024) based on the morphological similarities of the anamorphs and molecular data that were generated from the type of *A. puntilloi*.

In the material that we examined the fungus caused localized discoloration of the host thallus, the conidiogenous cells measured (4.5–)5.5–7(–8) × 2.5–3.5(–4.5) µm (n = 27) and the conidia measured (3–)3.5–4(–5) × (2–)2.5–3.5(–4) µm, l/w = (0.9–)1.1–1.5(–2) (n = 131). Our material fits the protologues of *Phoma lobariae* (conidiogenous cells 4–6 × 1.5–3.5 µm, conidia 3–4 × 2.5–3 µm; Etayo & Diederich 1995) and *Abrothallus puntilloi* (conidiogenous cells ca. 5–8 × 2–2.5 µm, conidia (3.5–)4–4.5 × (2.5–)3–3.5 µm, l/w = (1.1–)1.2–1.5(–1.6); Brackel & Puntillo 2016), as well as sizes of conidia given by Suija et al. (2024), (3–)3.5–4(–5) × (2–)2.5–3(–3.5) µm, l/w = 1–2. It is worth mentioning that Suija et al. (2024) found a statistically significant difference in conidial size between two *Abrothallus* species that grow on *Lobaria* (*A. lobariae* and *A. diederichii* Suija & F. Berger), and according to Suija et al. (2024) the latter has narrower conidia, (2–)2.5–4(–5) × (1–)1.5–2(–3) µm, l/w = 1–2.8.

This species was formerly known in Russia only from the Republic of Adygeya (Zhurbenko 2017) and Chukotka Autonomous Area (Zhurbenko & Braun 2013), although according to Suija et al. (2024) the latter record requires verification. Here it is reported for the first time from the Sakhalin Region of Russia. *Lobaria meridionalis* Vain. and *L. tuberculata* Yoshim. are also reported as new hosts species.

Specimens examined. – **RUSSIA. SAKHALIN REGION:** ITURUP ISLAND, Kurilka River valley, 45°10′15.6″N, 147°57′27.8″E, 243 m, *Quercus* forest, on *Lobaria meridionalis* (thallus) growing on *Q. crispula*, 28.v.2018, *A.K. Ezhkin s.n.* (LE F-355081a); the host is coinfected with *Tremella lobariacearum* s. l. (LE F-355081b). SAKHALIN ISLAND, near Mt. Maierskaya, Komissarovka River valley, 46°52′52.9″N, 142°53′56.7″E, 344 m, coniferous forest, on *L. tuberculata* (thallus) growing on *Picea jezoensis*, 25.vi.2013, *A.K. Ezhkin s.n.* (LE F-355082a); the host is coinfected with *Plectocarpon triebeliae* (LE F-355082c) and *Sclerococcum lobariellum* s. lat. (LE F-355082b).

***Merismatium lobariae* Zhurb.**

DISCUSSION. – This species was recently described from the Kamchatka Territory of Russia (holotype) and Alaska, the U.S.A., growing on *Lobarina scrobiculata* (Scop.) Nyl. ex Cromb. (type host), *Lobaria oregana* (Tuck.) Müll., and *Lobaria* sp. (Zhurbenko et al. 2020). Our material has ascospores that measure (7–)7.5–9(–10) × 3.5–4.5 µm, l/w = (1.7–)1.9–2.3(–2.4) (n = 23), which slightly extends the range given in the species protologue, (7.5–)8.5–10(–12.5) × (3–)4–5(–5.5) µm, l/w = (1.6–)1.8–2.4(–3.4). It is here reported for the first time from the Sakhalin Region of Russia and *Lobaria orientalis* (Asahina) Yoshim. is a new host species.

Specimens examined: **RUSSIA. SAKHALIN REGION,** KUNASHIR ISLAND, near Golovnina Volcano, 43°52′51.6″N, 145°36′20.3″E, 89 m, coniferous-broad-leaved forest, on *Lobaria orientalis* (thallus) growing on *Abies sachalinensis*, 22.viii.2017, *A.K. Ezhkin s.n.* (LE F-355080a); the host is coinfected with *Stigmidium lobariae* Zhurb. & Etayo (LE F-355080b).

***Plectocarpon* cf. *lichenum* (Sommerf.) D. Hawksw.**

DISCUSSION. – The studied specimens have the following differences from the description of this species by Ertz et al. (2005): 1) sterile stromatic tissue brown to dark brown versus dark greenish (but appearing olivaceous), K+ partly yellowish brown, brownish orange, olive brown or greyish green versus K+ green intensifying; 2) hymenium hyaline versus hyaline to sometimes partly greenish brown, K− or occasionally K+ greyish green versus K+ greenish, soon becoming bright yellow to almost orange; 3) ascospores somewhat shorter, (13–)15–17.5(–21) × (4.5–)5–6.5(–7.5) µm, l/w = 2–3.9 (n = 160) versus (16–)18.5–21.5(–23) × (5–)5.5–6.5(–7) µm, l/w = 3.1–3.8. Since the type host of this species is *Lobaria pulmonaria* (L.) Hoffm. (Hawksworth & Galloway 1984), it is possible that the above-mentioned differences correlate with atypical hosts (*Lobaria orientalis*, *L. spathulata* (Inumaru) Yoshim., and *L. tuberculata*) and deserve a taxonomic recognition. However further study and additional material is required to confirm that this is the case.

Plectocarpon lichenum is known from numerous occurences in Asia, Europe, and North America, and has also been reported from Africa, Macaronesia, and La Réunion, growing on *Lobaria anomala* (Brodo & Ahti) T. Sprib. & McCune, *L. anthraspis* (Ach.) T. Sprib. & McCune, and *L. pulmonaria* (Ertz et al. 2005). This species has also been reported from many regions of Russia, always on *Lobaria pulmonaria*, but not from the Sakahlin Region (Ertz et al. 2005, Zhurbenko 2007, 2017).

Specimens examined: **RUSSIA. SAKHALIN REGION:** ITURUP ISLAND, Kurilka River valley near Kurilsk village, 45°12′38.15″N, 147°55′41.91″E, 22 m, on *Lobaria orientalis* (thallus) growing on *Acer pictum*, 5.viii.2018, *A.K. Ezhkin s.n.* (LE F-355090). SAKHALIN ISLAND, Mt. Mitsul near Yuzhno-Sakhalinsk, 47°02′23.9″N, 142°30′50.9″E, 604 m, coniferous forest with *Betula ermanii*, on *L. tuberculata* (thallus) growing on *Picea jezoensis*, 20.v.2017, *A.K. Ezhkin s.n.* (LE F-355086). SHIKOTAN ISLAND: Tserkovnaya Bay, 43°44′16.5″N, 146°40′57.9″E, 47 m, coniferous-broad-leaved forest, on *L. spathulata* (thallus) growing on *Alnus hirsuta*, 15.vi.2017, *A.K. Ezhkin s.n.* (LE F-355085), on *L. tuberculata* (thallus) growing on *A. hirsuta*, 15.vi.2017, *A.K. Ezhkin s.n.* (LE F-355088, LE F-355089), on *L. tuberculata* (thallus) growing on *P. jezoensis*, 15.vi.2017, *A.K. Ezhkin s.n.* (LE F-355087).

***Plectocarpon triebeliae* Diederich & Ertz**

FIGURE 1

DESCRIPTION. – *Ascomata* initially immersed, erumpent at a very early stage and essentially superficial, dark brown to blackish, slightly glossy, occasionally with brownish orange remnants of the host cortex on the surface, epruinose, the surface divided by grooves into roundish to elongate, applanate areoles

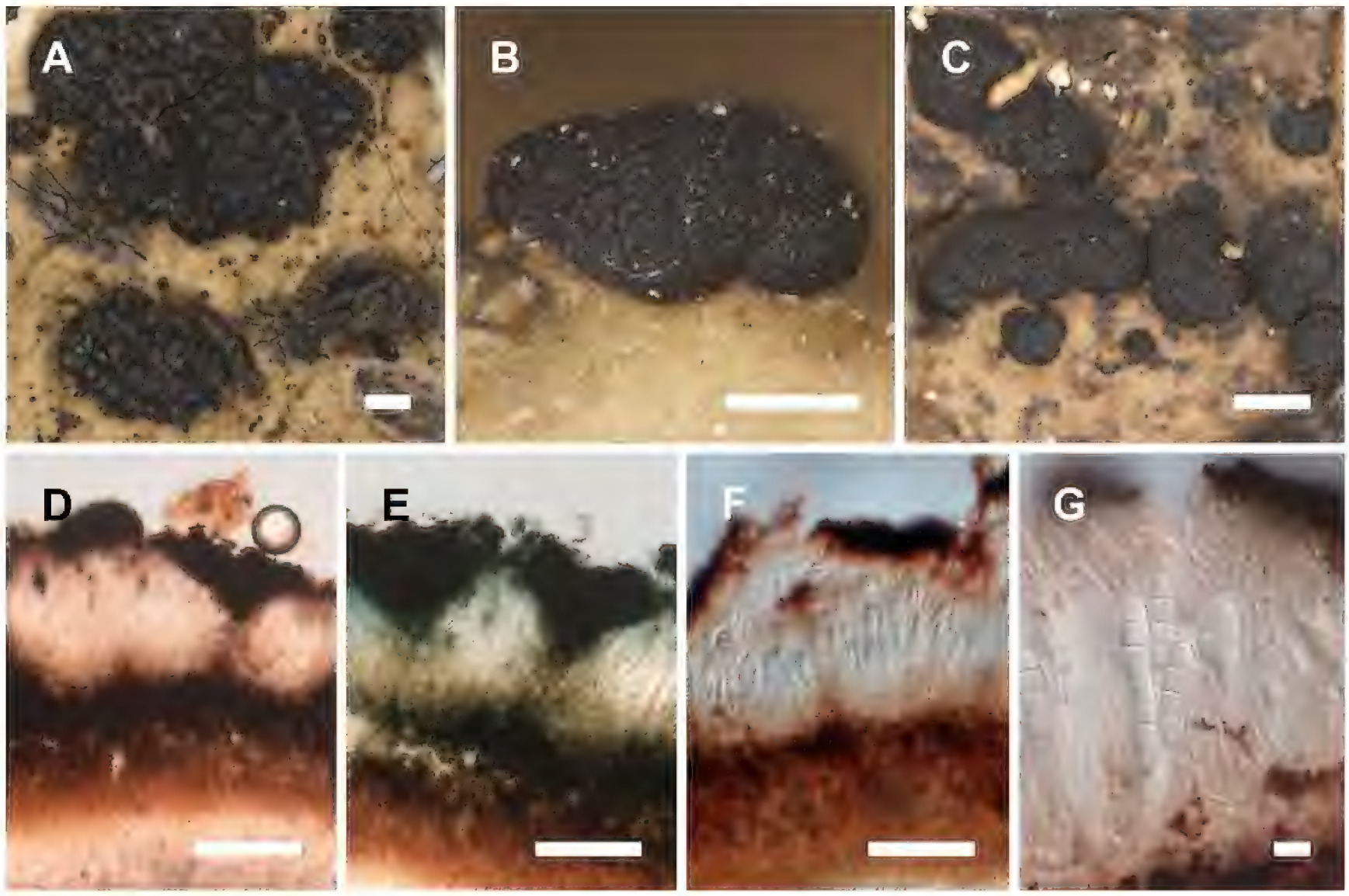

Figure 1. Morphology and antomy of *Plectocarpon triebeliae* (A from LE F-355141; B, D, E from LE F-355136; C from LE F-355131; F from LE F-355126; G from LE F-355137). **A,** erumpent ascomata. **B,** superficial ascoma. **C,** aggregated ascomata. **D,** ascoma in cross section in water. **E,** ascoma in cross section in K. **F,** ascoma in cross section in N. **G,** ascospores in water. Scale bars: A–C = 0.5 mm, D–F = 100 µm, G = 10 µm.

(40–)80–240(–380) µm (n = 47) in longest dimension, large ascomata sometimes with additional deeper cracks, rounded or somewhat elongated in surface view, occasionally irregularly shaped (mainly when overgrowing isidia or ridges of the host lobes), occasionally applanate, mostly convex to semi-globose (then sometimes constricted at the base), (0.3–)0.6–1.8(–3.5) mm diam. (n = 128), up to 410 µm tall (in section), arising singly or sometimes in groups of 2–6, sometimes contiguous; sometimes surrounded by a dark ring about 50 µm wide, apparently composed of stromatic tissue; sometimes associated with darkened areas of the host lobes. The host thallus under the ascoma is sometimes abnormally deformed (this is only visible on a section), which can be interpreted as gall formation. *Stroma* multilocular, locules (40–)55–170(–260) µm wide (n = 44); sterile stromatic tissue reddish brown, brown or dark brown, K+ olive brown/yellowish brown/light brown (between locules), greyish green/dull green to dark green/blackish (above and below locules), N+ brown to light brown/brownish orange; 20–120 µm thick between the surface of the ascoma and the upper part of the locules, 10–23 µm thick between the locules, 30–180 µm thick below the locules. *Hymenium* hyaline, 85–115 µm high, I+ red, sometimes with small blue areas, K/I+ blue, sometimes with small red areas. *Paraphyses* frequently septate, branched, anastomosed, 1–3.5 µm diam., not or slightly enlarged at the apex. *Asci* clavate, usually with a rather long stalk, with an apical K/I+ blue ring, 61–89 × 16–18 µm (n = 4) (4–)8-spored. *Ascospores* hyaline, cylindrical-clavate (wider in the upper half), fusiform or subcylindrical, with rounded or acute ends, (18–)23.5–29(–33) × (5–)6–8(–9.5) µm, l/w = (2.4–)3.1–4.5(–6) (n = 165), (1–)3-septate, sometimes slightly constricted at the median septum, wall ca. 0.5 µm thick, occasionally with a distinct perispore 1–1.5 µm thick (best seen in K), hyaline and smooth to occasionally light brown and granulate when overmature, mainly irregularly biseriate in the ascus. *Pycnidia* immersed, located between the locules, conidia not observed.

DISCUSSION. – The study of abundant new material made it possible to refine the phenotypic characteristics of this species in comparison with the protologue (Ertz et al. 2005), the main difference of which is the size of ascospores, which are given there as much narrower, 20–29 × 4.5–6 µm. This species

was previously known only from the U.S.A. (Minnesota) where it was found on *Ricasolia quercizans* (Michx.) Stizenb. (Ertz et al. 2005). Surprisingly, in the study area it appeared to be very common, being present in 31% (n = 34, from 17 locations) of the specimens examined, and was found not only on the type host mentioned above, but also on *Lobaria orientalis*, *L. sachalinensis* Asahina, *L. spathulata*, and *L. tuberculata*. It is noteworthy in this regard that according to Moncada et al. (2013) *Lobaria* and *Ricasolia* are phylogenetically closely related. The species is here reported new to Russia and Asia. *Lobaria* is also reported as a new host genus.

Specimens examined: **RUSSIA. SAKHALIN REGION:** ITURUP ISLAND: Kurilka River valley near Kurilsk village, 45°15′53.9″N, 147°56′13.94″E, 101 m, *Quercus* forest, on *Lobaria spathulata* (thallus) growing on *Q. crispula*, 29.vii.2018, *A.K. Ezhkin s.n.* (LE F-355129); Kurilka River valley near Kurilsk village, 45°12′51″N, 147°54′49″E, 67 m, riparian forest, on *L. sachalinensis* (thallus) growing on *Acer pictum,* 2.viii.2018, *A.K. Ezhkin 3116* (LE F-355144); near Kuril'sk Airport, 45°15′52.61″N, 147°56′03.18″E, 116 m, *Quercus* forest, on *L. tuberculata* (thallus) growing on *Q. crispula*, 31.v.2018, *A.K. Ezhkin s.n.* (LE F-355136). KUNASHIR ISLAND: Belkina River valley, 43°53′21.9″N, 145°36′54.7″E, 30 m, coniferous-broad-leaved forest, on *L. tuberculata* (thallus) growing on *Q. crispula*, 22.vi.2014, *A.K. Ezhkin s.n.* (SAK 1402); Belkina River valley, 43°54′10.9″N, 145°35′51.2″E, 55 m, coniferous forest, on *L. orientalis* (thallus) growing on *Abies sachalinensis*, 23.vi.2014, *A.K. Ezhkin s.n.* (SAK 1440); near Golovnina Volcano, 43°52′51.6″N, 145°36′20.3″E, 89 m, coniferous-broad-leaved forest, on *L. tuberculata* (thallus) growing on *A. sachalinensis*, 22.viii.2017, *A.K. Ezhkin s.n.* (LE F-355125); near Lagunnoe village, 44°02′5″N, 145°46′01.6″E, 79 m, coniferous-broad-leaved forest, on *L. tuberculata* (thallus) growing on *Acer pictum*, 22.viii.2015, *A.K. Ezhkin s.n.* (SAK 1401); Mt. Mitsul near Yuzhno-Sakhalinsk, 47°02′23.9″N, 142°30′50.9″E, 604 m, coniferous forest with *Betula ermanii*, on *L. tuberculata* (thallus) growing on *Picea jezoensis*, 20.v.2017, *A.K. Ezhkin s.n.* (LE F-355135); Mt. Mitsul near Yuzhno-Sakhalinsk, 47°03′02.3″N, 142°30′39.5″E, 536 m, coniferous forest with *B. ermanii*, on *L. spathulata* (thallus) growing on *Sorbus commixta*, 20.v.2017, *A.K. Ezhkin s.n.* (LE F-355122, LE F-355126, SAK 1385); near Tret'yakovo village, 43°58′28.8″N, 145°39′33.2″E, 109 m, coniferous-broad-leaved forest, on *L. tuberculata* (thallus) growing on *Ulmus laciniata*, 20.vi.2014, *A.K. Ezhkin s.n.* (LE F-355137, SAK 1446); near Tret'yakovo village, 43°58′28.38″N, 145°39′49.3″E, 163 m, coniferous-broad leaved forest, on *L. spathulata* (thallus) growing on *U. laciniata*, 20.vi.2014, *A.K. Ezhkin s.n.* (SAK 1450); near Tret'yakovo village, 43°58′34.1″N, 145°39′45.3″E, 191 m, coniferous-broad leaved forest, on *L. spathulata* (thallus) growing on *Magnolia obovata*, 22.vi.2014, *A.K. Ezhkin s.n.* (LE F-355134); Zmeinyi Creek valley, 44°00′27.6″N, 145°41′20.9″E, 98 m, coniferous-broad-leaved forest, on *L. spathulata* (thallus) growing on *Acer pictum*, 31.vii.2013, *A.K. Ezhkin s.n.* (LE F-355130); Zmeinyi Creek valley, 44°00′28.1″N, 145°41′38.9″E, 158 m, coniferous-broad-leaved forest, on *L. tuberculata* (thallus) growing on *Salix udensis*, 31.vii.2013, *A.K. Ezhkin s.n.* (SAK 1387); Zmeinyi Creek valley, 43°52′16.9″N, 145°29′28.4″E, 145 m, coniferous-broad-leaved forest, on *L. tuberculata* (thallus) growing on *Kalopanax septemlobus*, 8.viii.2015, *A.K. Ezhkin s.n.* (LE F-355138). SAKHALIN ISLAND: Dolinskii District, Anna River valley, 47°09′46.4″N, 143°01′44″E, 15 m, coniferous forest, on *L. tuberculata* (thallus) growing on *Sorbus commixta*, 30.x.2018, *A.K. Ezhkin s.n.* (LE F-355131, SAK 2404, SAK 2406); Mt. Bol'shevik near Yuzhno-Sakhalinsk, 46°57′33.5″N, 142°46′45.5″E, 312 m, coniferous forest, on *L. tuberculata* (thallus) growing on *S. commixta*, 30.viii.2014, *A.K. Ezhkin s.n.* (LE F-355123); on *L. spathulata* (thallus) growing on *S. commixta*, 30.viii.2014, *A.K. Ezhkin s.n.* (SAK 1416); Firsovka River valley, 47°38′42.5″N, 142°34′19.3″E, 18 m, coniferous forest, on *L. tuberculata* (thallus) growing on *S. commixta*, 1.v.2017, *A.K. Ezhkin s.n.* (LE F-355127); near Mt. Maierskaya, Komissarovka River valley, 46°52′52.9″N, 142°53′56.7″E, 344 m, coniferous forest, on *L. tuberculata* (thallus) growing on *Picea jezoensis*, 25.vi.2013, *A.K. Ezhkin s.n.* (LE F-355082c, LE F-355140a, SAK 1442); north slope of Mt. Turgeneva near Yuzhno-Sakhalinsk, 47°00′16.8″N, 142°46′19.1″E, 349 m, coniferous-broad-leaved forest, on *Ricasolia quercizans* (thallus) growing on *Salix caprea*, 19.xi.2011, *A.K. Ezhkin s.n.* (LE F-355141); on *L. tuberculata* (thallus) growing on *Sorbus commixta*, 19.xi.2011, *A.K. Ezhkin s.n.* (SAK 1409). SHIKOTAN ISLAND: Mt. Shikotan, 43°52′15.9″N, 146°50′42.5″E, 157 m, coniferous-broad-leaved forest, on *L. sachalinensis* (thallus) growing on *Acer pictum*, 11.vi.2017, *A.K. Ezhkin s.n.* (LE F-355128, LE F-355133, LE F-355139); Tserkovnaya Bay, 43°44′13.9″N, 146°41′12.9″E, 39 m, coniferous-broad-leaved forest, on

L. spathulata (thallus) growing on *Alnus hirsuta*, 12.vi.2017, *A.K. Ezhkin s.n.* (LE F-355132); on *L. tuberculata* (thallus) growing on *A. hirsuta*, 12.vi.2017, *A.K. Ezhkin s.n.* (LE F-355124).

***Sclerococcum lobariellum* (Nyl.) Ertz & Diederich s. lat.**

DISCUSSION. – To date, four species of *Sclerococcum* have been reported to grow on Lobariaceae: *Sclerococcum dendriscostictae* Y. Joshi, *S. lobariellum*, *S. ricasoliae* (Vouaux) Flakus, Rodr. Flakus & Etayo, and *S. stictae* Meng, Diederich & Thiyagaraja (Flakus et al. 2019, Joshi 2021, Meng et al. 2025, Nylander 1869). A comparison of some diagnostic characters of these species and the specimens we examined, is presented in Table 1. From this table it can be seen that the Asian specimens of *Sclerococcum* growing on *Ricasolia* are well distinguished from *S. ricasoliae* by a thicker basal exciple and larger ascospores. It is also noteworthy that along with typical ascospores with one septum, ascospores with 2–3 septa rarely occur in specimens on *Ricasolia japonica* (Zahlbr.) C. Cornejo (LE F-260916, LE F-355079). Our observations confirm those of Etayo (2017) and Flakus et al. (2019) that *S. ricasoliae* differs from *S. lobariellum* s. str. by a thinner basal and lateral exciple, while the hymenium height and ascospore size of these species were practically the same. It is noteworthy that the ascospore dimensions of the examined *Sclerococcum* specimens living on different hosts (*Lobaria pulmonaria*, *L. tuberculata*, and *Ricasolia* spp.) are statistically significantly different, which leaves room to speculate on the existence of as yet undescribed species of *Sclerococcum* growing on different members of Lobariaceae.

In Russia, *Sclerococcum lobariellum* was reported from the Caucasus (Zhurbenko 2017), Northern Urals (Zhurbenko 2004), southern Siberia (Zhurbenko 2012, Zhurbenko & Davydov 2000), and the Far East (Kedrovaya Pad Reserve in the Primorye Territory; Kondratyuk et al. 2015). Here it is reported new to the Sakhalin Region of Russia. *Lobaria tuberculata* and *Ricasolia japonica* are also reported as new host species.

Specimens examined: **RUSSIA. SAKHALIN REGION:** ITURUP ISLAND: Kurilka River valley near Kurilsk village, 45°12′59.8″N, 147°55′05.8″E, 30 m, mixed riparian forest, on *Lobaria tuberculata* (thallus) growing on *Alnus hirsuta*, 30.v.2018, *A.K. Ezhkin s.n.* (LE F-355078a); Kurilka River valley near Kurilsk village, 45°13′12.1″N, 147°54′13.8″E, 24 m, mixed riparian forest, on *Ricasolia japonica* (thallus) growing on *Padus ssiori*, 30.v.2018, *A.K. Ezhkin s.n.* (LE F-355079). KUNASHIR ISLAND, Zmeinyi Creek valley, 44°00′18.5″N, 145°41′15.3″E, 45 m, coniferous-broad-leaved forest, on *L. tuberculata* (thallus) growing on *Acer pictum*, 11.viii.2013, *A.K. Ezhkin s.n.* (LE F-355075). SAKHALIN ISLAND: near Mt. Maierskaya, Komissarovka River valley, 46°52′52.9″N, 142°53′56.7″E, 344 m, coniferous forest, on *L. tuberculata* (thallus) growing on *Picea jezoensis*, 25.vi.2013, *A.K. Ezhkin s.n.* (LE F-355082b, LE F-355140b); Mt. Mitsul near Yuzhno-Sakhalinsk, 47°03′02.3″N, 142°30′39.5″E, 536 m, coniferous forest with *Betula ermanii*, on *Ricasolia quercizans* (thallus) growing on *Betula ermanii*, 20.v.2017, *A.K. Ezhkin s.n.* (LE F-355076). SHIKOTAN ISLAND, near Mt. Bryusova, 43°50′54.6″N, 146°51′03.8″E, 56 m, riparian forest, on *L. pulmonaria* (thallus) growing on *Salix udensis*, 19.vi.2017, *A.K. Ezhkin s.n.* (LE F-355077).

Additional specimens of Sclerococcum lobariellum *s. lat. examined for comparison*: **CANADA. QUEBEC PROVINCE**, Forillon National Park, 48°51′N, 64°16′W, 100 m, deciduous forest, on *Lobaria pulmonaria* (thallus), 18.viii.1997, *D. Triebel & G. Rambold* (LE F-208750). – **JAPAN. HOKKAIDO**, Rishiri-Rebun-Sarobetsu National Park, 45°05′N, 141°39′E, 20 m, on *Ricasolia japonica* (thallus), 30.v.1995, *G. Thor 13599* (UPS). **KITAMI PROVINCE**, Rishiri Island, 45°13′N, 141°14′E, 200, on *R. japonica* (thallus), 1.vi.1995, *G. Thor 13869* (LE F-260916, UPS). – **RUSSIA. KARACHAYEVO-CIRCASSIAN REPUBLIC:** 3 km NE of Dombai settlement, 43°18.444′N, 41°38.069′E, 1700 m, mixed forest, on *Lobaria pulmonaria* (thallus), 14.viii.2012, *M.P. Zhurbenko 12118* (LE F-261467); 10 km E of Dombai settlement, 43.31524°N, 41.69870°E, 1600 m, *Picea-Abies* dominated forest, on *L. pulmonaria* (thallus), 15.viii.2012, *M.P. Zhurbenko 12117* (LE F-261337); 10 km E of Dombai settlement, 43.29327°N, 41.76511°E, 1700 m, mixed forest, on *Ricasolia amplissima* (Scop.) De Not. (thallus), 15.viii.2012, *M.P. Zhurbenko 1231* (LE F-261331); near confluence of Baduk and Teberda Rivers, 43°22′33″N, 41°41′35″E, 1450 m, mixed forest, on *Lobaria pulmonaria* (thallus), 20.viii.2012, *M.P. Zhurbenko 12116* (LE F-261307); 1 km W of Dombai settlement, 43°17′52″N, 41°35′37″E, 1800 m, *Picea orientalis-Abies nordmanniana-Fagus orientalis* forest, on *L. pulmonaria* (thallus), 21.viii.2012, *M.P. Zhurbenko 12115*

Table 1. Comparison of diagnostic characters of *Sclerococcum* on Lobariaceae based on literature and original materials. Note: *S. lobariellum* was described from Europe (France) growing on *Lobaria pulmonaria* (Nylander 1869) and subsequently reported from many other European countries, but also from Macaronesia, Asia, North and South America, and Oceania collected on species of *Emmanuelia*, *Lobaria*, *Lobariella*, *Ricasolia*, *Pseudocyphellaria*, *Sticta*, and *Yoshimuriella* (Diederich 2003; Etayo 2017; Etayo & Diederich 1996; Flakus & Kukwa 2012; Hawksworth 1975; Hafellner 1979; Hafellner & Mayrhofer 2007; Zhurbenko 2009, 2012, 2013, 2017). However, according to Diederich et al. (2024) this species is known with certainty only from *L. pulmonaria*.

Sclerococcum	**Lateral exciple** (µm wide)	**Basal exciple/hypothecium** (µm wide)	**Hymenium** (µm high)	**Ascospores**				**Host(s) / known distribution** when appropriate	**Source(s) of information**
				length (µm)	width (µm)	l/w ratio	surface		
dendriscostictae	30–40	(25–)30–40(–60)	(25–)35–50(–75)	9–11(–12)	(3–)4–6(–7)	not specified	smooth	*Dendriscosticta platyphylla* (type host), *D. wrightii*, *Sticta henryana* / Asia	Joshi (2021)
***lobariellum* s. str.**	40–70(–80) (n = 49)	(50–)70–140(–190) (n = 44)	(45–)50–65(–70) (n = 20)	(8.5–)11–13.5(–17)	(4–)5–6(–7.5)	(1.5–)1.9–2.5(–3.2) (n = 280)	verrucose	*Lobaria pulmonaria*	12 specimens from Europe, Asia and North America examined
***lobariellum* s. lat.**	not specified	not specified	50–70	12–17	4.5–6.5	2.7	verrucose	*Emmanuelia erosa*, *Lobaria pulmonaria* (type host), *Ricasolia quercizans*, *Yoshimuriella dissecta* / Europe, North and South America	Hafellner (1979)
***lobariellum* s. lat.**	30–50(–60) (n = 20)	(60–)75–125(–150) (n = 15)	55–70(–75) (n = 9)	(7.5–)9–12(–14.5)	(4–)4.5–6(–7)	(1.3–)1.6–2.4(–3.3) (n = 116)	verrucose	*Lobaria tuberculata*	four specimens from Asia examined
***lobariellum* s. lat.**	(30–)40–60(–75) (n = 21)	(30–)60–110(–130) (n = 19)	(45–)50–70(–85) (n = 23)	(8.5–)11.5–16(–20.5)	(4–)6–6.5(–10.5)	(1.3–)1.9–2.5(–3.4) (n = 391)	verrucose	*Ricasolia amplissima*, *R. japonica*, and *R. quercizans*	six specimens from Asia examined
ricasoliae	20–40	25–50	45–70	(8–)10–13.5(–15)	(4–)4.5–6	(1.5–)2–2.5(–3.5)	verrucose	*Lobariella* (type host?), *Ricasolia* (type host?), and *Yoshimuriella* / neotropics of South and North America	Etayo (2017), Flakus et al. (2019)
stictae	40–70	(86–)90–95(–97) (n = 30)	(46–)65–95(–96) (n = 30)	(8–)9–11(–12)	(5–)5–6(–7)	(1.5–)1.7–1.9(–2) (n = 30)	verrucose	*Sticta* sp. / Asia	Meng et al. (2025)

(LE F-261327). **Komi Republic:** Northern Ural, headwaters of the Pechora River, foot of Mt. Medvezhii Kamen', 62°04′N, 59°05′E, 500 m, *Picea-Abies-Betula-Sorbus* forest, 2.vii.1997, *M.P. Zhurbenko 97200* (LE F-207798); headwaters of the Pechora River, 6 km NE of Sobinskoe, 62°02′N, 58°05′E, 180 m, mixed spruce forest, on *L. pulmonaria* (thallus), 10.vii.1997, *M.P. Zhurbenko 97197* (LE F-207795). **Krasnoyarsk Territory**, Krasnoyarsk Pillars (Stolby) National Park, 55°55′N, 92°43′E, 550 m, mixed forest, on *L. pulmonaria* (thallus), 17.viii.2010, *M.P. Zhurbenko 1025* (LE F-260673). **Republic of Adygeya:** Mt. Bol'shoi Tkhach, 44°03′N, 40°24′E, 1800 m, on *L. pulmonaria* (thallus), 10.ix.1998, *V. Otte L 2209* (LE F-260766); Caucasian Biosphere Reserve, road between Guzeripl' settlement and Dom Kotova cabin, 43°58′27″N, 40°11′50″E, 1400 m, *Abies nordmanniana* forest, on *Ricasolia amplissima* (thallus), 10.viii.2014, *M.P. Zhurbenko 14367b* (LE F-309538b); on *Lobaria pulmonaria* (thallus), 10.viii.2014, *M.P. Zhurbenko 14365b* (LE F-309529b); near Guzeripl' settlement, 43°59′25″N, 40°08′56″E, 770 m, *Fagus orientalis-Abies nordmanniana* forest, on *L. pulmonaria* (thallus), 13.viii.2014, *M.P. Zhurbenko 14373b* (LE F-309532b).

***Stigmidium lobariae* Zhurb. & Etayo**

Discussion. – This species was previously known from Portugal (Madeira), Spain, and the U.S.A. (Alaska) where it was reported as growing on *Lobaria pulmonaria* (holotype) and *L. macaronesica* (Berger & Zimmermann 2016, Zhurbenko & Etayo 2012). Here it is reported new to Russia and *Lobaria orientalis* is a new host species.

Specimens examined: **RUSSIA. Sakhalin Region,** KUNASHIR ISLAND, near Golovnina Volcano, 43°52′51.6″N, 145°36′20.3″E, 89 m, coniferous-broad-leaved forest, on *Lobaria orientalis* (thallus) growing on *Abies sachalinensis*, 22.viii.2017, *A.K. Ezhkin s.n.* (LE F-355080b); the host is coinfected with *Merismatium lobariae* (LE F-355080a).

***Tremella lobariacearum* Diederich & M.S. Christ. s. lat.**

Discussion. – It is interesting to note that the tomentum of *Lobaria* species, which usually grows on the lower surface of its lobes, occasionally also developed on the upper surface around the basidiomatal galls of *Tremella lobariacearum* (observed in specimens LE F-355102, LE F-355105, LE F-355107, and LE F-355113, on *Lobaria meridionalis*). Understood broadly, this species has a cosmopolitan distribution and possibly includes a number of cryptic species (Diederich et al. 2022). Considering this hypothesis the specimens cited below are organized into separate sections for each host species. In the study area, it is the most frequent lichenicolous fungus on *Lobaria*, being present in 50% (n = 51, from 15 locations) of the specimens examined. Surprisingly, in Russia it was previously known only from a report on *Lobaria isidiosa* (Müll. Arg.) Vain. in the Primorye Territory (Diederich 1996). Here the species is newly reported from the Sakhalin Region of Russia.

Specimens examined on Lobaria meridionalis. – **RUSSIA. Sakhalin Region:** ITURUP ISLAND: Kurilka River valley, 45°10′15.6″N, 147°57′27.8″E, 243 m, *Quercus* forest, on *L. meridionalis* (isidiate parts of lobes) growing on *Q. crispula*, 28.v.2018, *A.K. Ezhkin s.n.* (LE F-355081b, LE F-355113); Kurilka River valley, 45°10′12.2″N, 147°57′21.6″E, 246 m, *Quercus* forest, on *L. meridionalis* (isidiate parts of lobes) growing on *Q. crispula*, 28.v.2018, *A.K. Ezhkin s.n.* (SAK 2425); on *L. meridionalis* (isidiate parts of lobes) growing on *Padus ssiori*, 28.v.2018, *A.K. Ezhkin* (LE F-355107, SAK 2437); Kurilka River valley, 45°12′59.8″N, 147°55′05.8″E, 30 m, mixed riparian forest, on *L. meridionalis* (isidiate parts of lobes, rarely their underside) growing on *Alnus hirsuta*, 30.v.2018, *A.K. Ezhkin s.n.* (LE F-355097, LE F-355098, LE F-355104, LE F-355105, LE F-355108, LE F-355109, LE F-355110, LE F-355111, LE F-355112, SAK 2396); Kurilka River valley, 45°13′12.1″N, 147°54′13.8″E, 24 m, mixed riparian forest, on *L. meridionalis* (isidiate parts of lobes) growing on *Padus ssiori*, 30.v.2018, *A.K. Ezhkin s.n.* (LE F-355099, LE F-355101, LE F-355102, LE F-355103, SAK 2416, SAK 2419, SAK 2433); Mt. Pereval'naya, 45°07′49.7″N, 147°47′06.4″E, 253 m, *Quercus* forest with *Larix kurilensis*, on *L. meridionalis* (isidiate parts of lobes) growing on *Q. crispula*, 1.vi.2018, *A.K. Ezhkin s.n.* (LE F-355100, LE F-355106, SAK 2409, SAK 2438); Mt. Pereval'naya, 45°07′50.6″N, 147°47′21.9″E, 253 m, *Quercus* forest with *Abies*, on *L. meridionalis* (isidiate parts of lobes) growing on *Q. crispula*, 1.vi.2018, *A.K. Ezhkin s.n.* (SAK 2411).

Specimens examined on Lobaria pulmonaria. – **RUSSIA. SAKHALIN REGION:** ITURUP ISLAND: Kurilka River valley, 45°13′12.1″N, 147°54′13.8″E, 24 m, mixed riparian forest, on *L. pulmonaria* (upper lobe side) growing on *Salix* sp., 30.v.2018, *A.K. Ezhkin s.n.* (SAK 2412); on *L. pulmonaria* (sorediate-isidiate parts of lobes) growing on *Padus ssiori*, 30.v.2018, *A.K. Ezhkin s.n.* (LE F-355094); Kurilka River valley, 45°12′59.8″N 147°55′05.8″E, 30 m, mixed riparian forest, on *L. pulmonaria* (sorediate-isidiate parts of lobes, their margins and underside) growing on *Sorbus commixta*, 30.v.2018, *A.K. Ezhkin s.n.* (LE F-355091, SAK 2428); on *L. pulmonaria* (sorediate-isidiate parts of lobes, their margins and underside) growing on *Alnus hirsuta*, 30.v.2018, *A.K. Ezhkin s.n.* (LE F-355095, SAK 2434, SAK 2446); near Kuril'sk airport, 45°15′52.6″N, 147°56′03.2″E, 116 m, *Quercus* forest, on *L. pulmonaria* (upper lobe side) growing on *Q. crispula*, 31.v.2018, *A.K. Ezhkin s.n.* (SAK 2422). KUNASHIR ISLAND, Prosolovskie springs near Rurui Volcano, 44°19′58.4″N, 146°1′14.5″E, 15 m, coniferous-broad-leaved forest, on *L. pulmonaria* (sorediate-isidiate parts of lobes and their underside) growing on *Q. crispula*, 19.vi.2014, *A.K. Ezhkin s.n.* (LE F-355092, LE F-355096). SAKHALIN ISLAND, Poronaiskii District, middle course of Poronai River, 49°54′24.95″N, 142°56′46.98″E, 61 m, riparian forest, on *L. pulmonaria* (sorediate-isidiate parts of lobes, their margins and underside) growing on *Picea jezoensis*, 16.ix. 2018, *A.K. Ezhkin s.n.* (LE F-355093).

Specimens examined on Lobaria tuberculata. – **RUSSIA. SAKHALIN REGION:** KUNASHIR ISLAND: near Lagunnoe village, 44°02′50.2″N, 145°46′01.6″E, 79 m, coniferous-broad-leaved forest, on *L. tuberculata* (isidiate parts of lobes) growing on *Acer pictum*, 22.viii.2015, *A.K. Ezhkin s.n.* (SAK 1397); on *L. tuberculata* (isidiate parts of lobes) growing on *Taxus cuspidata*, 22.viii.2015, *A.K. Ezhkin s.n.* (SAK 1403); near Tret'yakovo village, 43°58′34.1″N, 145°39′45.4″E, 191 m, coniferous-broad-leaved forest, on *L. tuberculata* (isidiate parts of lobes) growing on *Salix udensis*, 22.vi.2014, *A.K. Ezhkin s.n.* (SAK 1388); Zmeinyi Creek valley, 44°00′25.3″N, 145°41′33.51″E, 106 m, broad-leaved forest, on *L. tuberculata* (isidiate parts of lobes) growing on *Ulmus laciniata*, 11.viii.2013, *A.K. Ezhkin s.n.* (SAK 1389). SAKHALIN ISLAND, Dolinskii District, Anna River valley, 47°09′46.4″N, 143°01′44″E, 15 m, coniferous forest, on *L. tuberculata* (isidiate parts of lobes) growing on *Salix caprea*, 30.x.2018, *A.K. Ezhkin s.n.* (LE F-355117, LE F-355121); on *L. tuberculata* (isidiate parts of lobes) growing on *Sorbus commixta*, 30.x.2018, *A.K. Ezhkin s.n.* (SAK 2403). SHIKOTAN ISLAND, Tserkovnaya Bay, 43°44′08.6″N, 146°41′07.7″E, 49 m, coniferous-broad-leaved forest, on *L. tuberculata* (isidiate parts of lobes, rarely their underside) growing on *Picea jezoensis*, 12.vi.2017, *A.K. Ezhkin s.n.* (SAK 1432); Tserkovnaya Bay, 43°44′16.5″N, 146°40′57.9″E, 47 m, coniferous-broad-leaved forest, on *L. tuberculata* (isidiate parts of lobes, rarely their underside) growing on *P. jezoensis*, 15.vi.2017, *A.K. Ezhkin s.n.* (LE F-355115, LE F-355116); on *L. tuberculata* (isidiate parts of lobes, rarely their underside) growing on *Alnus hirsuta*, 15.vi.2017, *A.K. Ezhkin s.n.* (LE F-355118, LE F-355119, LE F-355120, SAK 1428).

Verrucoccum coppinsii V. Atienza, D. Hawksw. & Pérez-Ort. agg.

FIGURE 2

DESCRIPTION. – Infection forming patches on the upper surface of the host lobes up to 1.5 mm diam., merging into larger patches up to 4.2 mm diam. *Vegetative hyphae* abundant/well-developed, brown, glossy, sparsely branched, septate, constricted at the septa, composed of cells 4–8.5 µm diam., 4.5–16 µm long with a finely granulate surface, mainly superficial, forming a dense weave around the conidiomata, clearly visible under a stereomicroscope. *Ascomata* not observed. *Conidiomata* pycnidioid, brown to black (colour not changing when moistened), matt, coarsely warted to rugose, hemispherical to subglobose, sometimes shortly papillate, occasionally constricted at the base, 120–200 µm diam., with a circular apical ostiole 8–26 µm diam., ± superficial, dispersed to aggregated in groups of up to 16 (sometimes in a circle), sometimes contiguous. In cross section, conidiomata sometimes resembling pycnothyria, with distinct upper and lateral walls and a poorly differentiated, colourless or slightly brownish basal wall. Upper and lateral walls of conidioma in cross section composed of isodiametric or somewhat tangentially elongated cells; the outer 2–4 cell layers (8–24 µm thick) brown, K–, with wart-like external protrusions; the inner cell layers (sub)hyaline; in surface view of *textura angularis*, composed of polyhedral cells 5–12.5 × 3.5–9.5 µm, with walls 1–2 µm thick. *Conidiophores* reduced to conidiogenous cells. *Conidiogenous cells* holoblastic, monoblastic, not proliferating, hyaline, ± ampulliform, lining the inner wall of the conidiomatal cavity. *Conidia* acrogenous, initially hyaline, then light brown, pyriform, obovoid, occasionally ellipsoidal, oval or oblong, with an obtuse apex and a somewhat truncate base, occasionally with both ends obtuse, a central pore in the base not observed, (7.5–)9.5–12.5(–14.5) × (4.5–)7–8(–9.5) µm, l/w = (1–)1.3–1.7(–2.1) (n = 146), aseptate, wall 0.5–0.7 µm thick, smooth to minutely granulate (when mature), often with 1–2 large guttules.

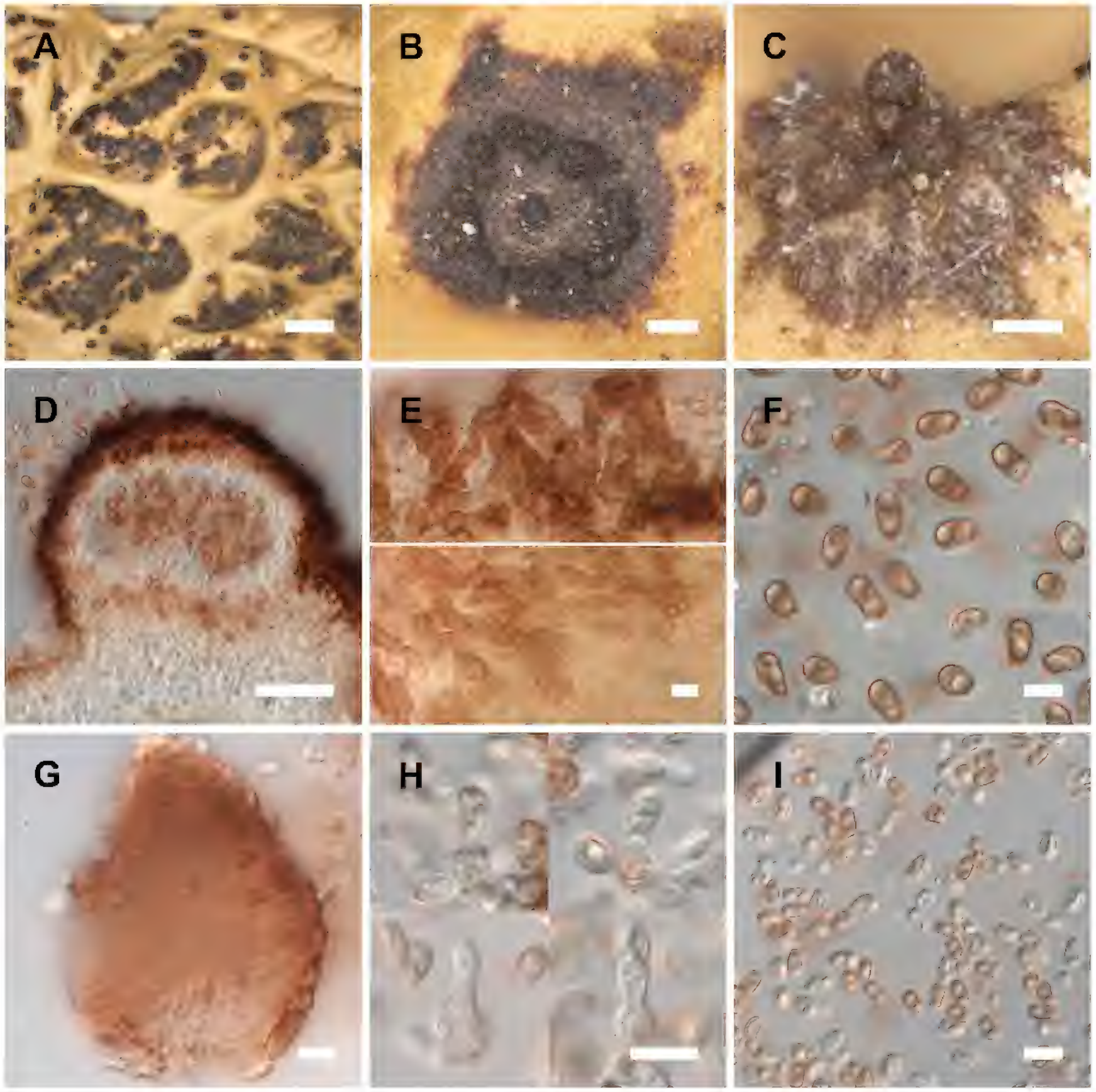

Figure 2. Morphology and anatomy of *Verrucoccum coppinsii* agg. including its presumable synanamorph (G–I) (A, B from LE F-355084; C–I from LE F-355083). **A,** patches of infection on lobes of *Lobaria pulmonaria*. **B,** an isolated patch of infection. **C,** habitus of conidiomata surrounded by vegetative hyphae. **D,** conidioma in cross-section. **E,** vegetative hyphae. **F,** conidia. **G,** squash preparation of a conidioma of a presumable synanamorph. **H,** conidiogenous cells of a presumable synanamorph. **I,** conidia of a presumable synanamorph. D–I in water. Scale bars: A = 2 mm, B = 200 µm, C = 100 µm, D = 50 µm, E–I = 10 µm.

DISCUSSION. – In the protologue of this species (Atienza et al. 2021) there are two significant inconsistencies with the material we studied. First, the vegetative hyphae were not noted there, and in the generic protologue of *Verrucoccum* V. Atienza, D. Hawksw. & Pérez-Ort., they were described as immersed and subhyaline. Second, the conidia were described as initially pale brown, becoming dark brown, with a central pore in the base, smooth-walled, on average longer, (11–)11.5–14(– 15) × (5–)6–8.5(–9) µm, and more elongated in shape, l/w = 1.5–3. However, the description of this species by Brackel & Puntillo (2023: Fig. 13) confirms that conidiomata are surrounded by macroscopically conspicuous brown vegetative hyphae, and the conidia become minutely granular with age. Our material matches the observations of Brackel & Puntillo (2023) and we provide a revised species description here. In one of the specimens that we examined (LE F-355083), along with the conidiomata described above, we also observed brown, narrowly obpyriform, superficial conidiomata, 80–120 µm in diameter, containing

ampulliform conidiogenous cells, and conidia similar in colour and shape, also aseptate, but much smaller and smooth-walled, (4.5–)6–7.5(–9) × (3.5–)4–5(–6) µm, l/w = (1–)1.3–1.7(–2.1) (n = 100). We assume that these conidiomata are a previously unknown synanamorph of this species.

This species was previously known from the United Kingdom and Italy where it was found on thalli of *Lobaria pulmonaria* (Atienza et al. 2021, Brackel & Puntillo 2023). Here it is reported new to Russia and Asia.

Specimens examined: **RUSSIA. SAKHALIN REGION:** SAKHALIN ISLAND: Pilenga River valley, near Ado-Tymovo village, 51°04′30.4″N, 142°44′47.9″E, 112 m, riparian forest, on *Lobaria pulmonaria* (thallus) growing on *Salix udensis*, 4.vi.2017, *A.K. Ezhkin s.n.* (LE F-355083); Pilenga River valley, near Ado-Tymovo village, 51°02′9.8″N, 142°49′41.3″E, 155 m, riparian forest, on *L. pulmonaria* growing on *Ulmus laciniata*, 5.vi.2017, *A.K. Ezhkin s.n.* (LE F-355084).

ACKNOWLEDGEMENTS

The research of M. P. Zhurbenko was carried out within the framework of the research project of the V. L. Komarov Botanical Institute of the Russian Academy of Sciences 'Taxonomic, ecological and structural-functional diversity of fungi and fungus-like protists' (124013100829-3) using the equipment of the Core Facility Center 'Cell and Molecular Technologies in Plant Science' of the V. L. Komarov Botanical Institute. The research of A. K. Ezhkin was carried out within the framework of the research project of the Institute of Marine Geology and Geophysics of the Far Eastern Branch of the Russian Academy of Sciences 'Comprehensive assessment of the impact of environmental factors on the geosystems of Sakhalin and the Kuril Islands' (AAAA-A18-118012290122-1). Wolfgang von Brackel and Violeta Atienza provided valuable comments on *Verrucoccum coppinsii* agg. and Javier Etayo on *Plectocarpon* cf. *lichenum*.

LITERATURE CITED

Atienza, V., D.L. Hawksworth and S. Pérez-Ortega. 2021. *Verrucoccum* (Dothideomycetes, Dictyosporiaceae), a new genus of lichenicolous fungi on *Lobaria* s. lat. for the *Dothidea hymeniicola* species complex. Mycologia 113: 1233–1252.

Berger, F. and E. Zimmermann. 2016. Ergänzungen zur Flechtenflora von Madeira mit besonderer Berücksichtigung lichenicoler Pilze. Herzogia 29: 235–276.

Brackel von, W. and D. Puntillo. 2016. New records of lichenicolous fungi from Calabria (southern Italy), including a first checklist. Herzogia 29: 277–306.

Brackel von, W. and D. Puntillo. 2023. Additions to the flora of lichenicolous fungi of Southern Italy. Borziana 4: 5–31.

Chabanenko, S. I. 2002. *Synopsis of lichen flora of the south of the Russian Far East*. Vladivostok: Dal'nauka. 232 pp. (In Russian).

Diederich, P. 1996. The lichenicolous heterobasidiomycetes. Bibliotheca Lichenologica 61: 1–198.

Diederich, P. 2003. New species and new records of American lichenicolous fungi. Herzogia 16: 41–90.

Diederich, P., J.D. Lawrey and D. Ertz. 2018. The 2018 classification and checklist of lichenicolous fungi, with 2000 non-lichenized, obligately lichenicolous taxa. The Bryologist 121: 340–425.

Diederich, P., A.M. Millanes, M. Wedin and J.D. Lawrey. 2022. *Flora of Lichenicolous Fungi, Vol. 1, Basidiomycota*. Luxembourg: National Museum of Natural History. 351 pp.

Diederich, P., D. Ertz and U. Braun. 2024. *Flora of Lichenicolous Fungi, Vol. 2, Hyphomycetes*. Luxembourg: National Museum of Natural History. 544 pp.

Ertz, D., C. Christnach, M. Wedin and P. Diederich. 2005. A world monograph of the genus *Plectocarpon* (Roccellaceae, Arthoniales). Bibliotheca Lichenologica 91: 1–155.

Etayo, J. 2017. Hongos liquenícolas de Ecuador. Opera Lilloana 50: 1–535.

Etayo, J. and P. Diederich. 1995. Lichenicolous fungi from the western Pyrenees, France and Spain. I. New species of Deuteromycetes. In: F.J.A. Daniels, M. Schulz and J. Peine (eds.), Flechten Follmann. Contributions to Lichenology in Honour of Gerhard Follmann. Geobotanical and Phytotaxonomical Study Group, Botanical Institute, University of Cologne, Cologne. Pp. 205–221.

Etayo, J. and P. Diederich. 1996. Lichenicolous fungi from the western Pyrenees, France and Spain. III. Species on *Lobaria pulmonaria*. Bulletin de la Société des naturalistes luxembourgeois 97: 93–118.

Flakus, A. and M. Kukwa. 2012. New records of lichenicolous fungi from Bolivia. Opuscula Philolichenum 11: 36–48.

Flakus, A., J. Etayo, J. Miadlikowska, F. Lutzoni, M. Kukwa, N. Matura and P. Rodriguez-Flakus. 2019. Biodiversity assessment of ascomycetes inhabiting Lobariella lichens in Andean cloud forests led to one new family, three new genera and 13 new species of lichenicolous fungi. Plant and Fungal Systematics 64: 283–344.

Hafellner, J. 1979. *Karschia*. Revision einer Sammelgattung an der Grenze von lichenisierten und nichtlichenisierten Ascomyceten. Beiheft zur Nova Hedwigia 62: 1–248.

Hafellner, J. and H. Mayrhofer. 2007. A contribution to the knowledge of lichenicolous fungi and lichens occurring in New Zealand. Bibliotheca Lichenologica 95: 225–266.
Hawksworth, D.L. 1975. Notes on British lichenicolous fungi, I. Kew Bulletin 30: 183–203.
Hawksworth, D.L. 2005. *Dothidea hymeniicola*: an overlooked *Endococcus* species on *Lobaria* in Central America. Herzogia 18: 17–21.
Hawksworth, D.L. and D.J. Galloway. 1984. The identity of *Plectocarpon* Fee, and its implications for *Lichenomyces pseudocyphellaria* and the typification of *Sticta delisea*. The Lichenologist 16: 85–89.
Joshi, Y. 2021. Two new species of lichenicolous fungus *Sclerococcum* (Dactylosporaceae, Sclerococcales) from India. Acta Botanica Hungarica 63: 67–75.
Khomenko, Z.N. 2003. *Reference book on physical geography of the Sakhalin Region*. Yuzhno-Sakhalinsk: Sakhalin Book Publishing House, 110 pp. (In Russian).
Kondratyuk, S.Y. and D.J. Galloway. 1995. Two new lichenicolous fungi from *Lobaria* and *Sticta* (Stictaceae). In: F.J.A. Daniels, M. Schulz and J. Peine (eds.), Flechten Follmann. Contributions to Lichenology in Honour of Gerhard Follmann. Geobotanical and Phytotaxonomical Study Group, Botanical Institute, University of Cologne, Cologne. Pp. 255–261.
Kondratyuk, S.Y., L. Lokös, E. Farkas, S.-O. Oh and J.-S. Hur. 2015. New and noteworthy lichen-forming and lichenicolous fungi 2. Acta Botanica Hungarica 57: 77–141.
Kornerup, A. and J.H. Wanscher. 1978. *Methuen handbook of colour. 3rd ed., reprinted*. London: Eyre Methuen Ltd. 252 pp.
Meng, Q., P. Diederich, V. Thiyagaraja, D. Ertz, X. Wang, N. Saichana, K.D. Hyde, R. S. Jayawardena and S. Fu. 2025. *Lijiangomyces laojunensis* gen. et sp. nov. (Mytilinidiaceae), and *Sclerococcum stictae* (Dactylosporaceae), a new lichenicolous species from Yunnan, China. MycoKeys 114: 277–298.
Moncada, B., R. Lücking and L. Betancourt-Macuase. 2013. Phylogeny of the Lobariaceae (lichenized Ascomycota: Peltigerales), with a reappraisal of the genus *Lobariella*. The Lichenologist 45: 203–263.
Nylander, W. 1869. Addenda nova ad Lichenographiam Europaeam. Continuatio undecima. Flora (Regensburg) 52: 293–298.
Suija, A., F. Berger, A. Arsenault, P. Baines, E. Zimmermann and J. Etayo. 2024. New species, a taxonomic combination, and records of lichenicolous *Abrothallus* (Abrothallales, Dothideomycetes): species on Peltigeraceae and Pannariaceae. Mycological Progress 23: 58. https://doi.org/10.1007/s11557-024-01994-w.
Stepanchikova, I.S. and L.V. Gagarina. 2014. Chapter 8. Collection, identification and storage of lichenological collections. In: M.P. Andreev and D.E. Himelbrant (eds.), The lichen flora of Russia. Biology, ecology, diversity, distribution and methods to study lichens. KMK Scientific Press, Moscow–St. Petersburg. Pp. 204–219. (In Russian).
Zemtsova, A.I. 1968. *Climate of Sakhalin*. Leningrad: Gidrometeoizdat. 197 pp. (In Russian).
Zhurbenko, M.P. 2004. Lichenicolous and some interesting lichenized fungi from the Northern Ural, Komi Republic of Russia. Herzogia 17: 77–86.
Zhurbenko, M.P. 2007. The lichenicolous fungi of Russia: geographical overview and a first checklist. Mycologia Balcanica 4: 105–124.
Zhurbenko, M.P. 2009. Lichenicolous fungi and some lichens from the Holarctic. Opuscula Philolichenum 6: 87–120.
Zhurbenko, M.P. 2012. New records of lichenicolous fungi from state nature reserve "Stolby" (Krasnoyarsk Territory). Novosti sistematiki nizshikh rastenii (St Petersburg) 46: 92–95. (In Russian, English summ.)
Zhurbenko, M.P. 2013. Lichenicolous fungi and some allied lichens from the Canadian Arctic. Opuscula Philolichenum 12: 180–197.
Zhurbenko, M.P. 2017. Lichenicolous fungi of the Caucasus: New species, new records and a second synopsis. Opuscula Philolichenum 16: 267–311.
Zhurbenko, M.P. and U. Braun. 2013. *Ameroconium cladoniae* gen. et sp. nov. and *Phoma psoromatis* sp. nov., new anamorphic lichenicolous fungi from the Holarctic. The Lichenologist 45: 583–591.
Zhurbenko, M.P. and E.A. Davydov. 2000. Lichenicolous fungi and some lichens from the Russian Altai, southern Siberia. Folia Cryptogamica Estonica 37: 109–118.
Zhurbenko, M.P. and J. Etayo. 2012. *Stigmidium lobariae*, a new lichenicolous fungus from the Holarctic. Mycosphere 3: 62–64.
Zhurbenko, M.P., A. Frisch, Y. Ohmura and G. Thor. 2015. Lichenicolous fungi from Japan and Korea: new species, new records and a first synopsis for Japan. Herzogia 28: 762–789.
Zhurbenko, M.P., I.S. Stepanchikova and D.E. Himelbrant. 2020. New species and new records of lichenicolous fungi from the Kamchatka Territory of Russia. Herzogia 33: 512–524.

Opuscula Philolichenum, **24**: 127–156. 2025. [pagination corrected version, published 9.January.2026]
**pdf first effectively published online 2.September.2025 via (http://sweetgum.nybg.org/philolichenum/)*

Contributions to the Ontario biota of lichens and allied fungi, with emphasis on the Great Lakes Basin: Recent collections from the Carolinian Zone

SAMUEL R. BRINKER[1]

ABSTRACT. – Taxonomic, distributional and ecological notes on 25 lichens, allied fungi and lichenicolous fungi are presented from the most southerly portion of the Province of Ontario. One species, *Lemmopsis pelodes* is reported for the first time from North America. Eight species, *Canoparmelia texana*, *Gyalideopsis moodyae*, *Myelochroa metarevoluta, Parmotrema austrosinense, Parmotrema gardneri*, *Pyxine subcinerea, Scoliciosporum pensylvanicum* and *Teloschistes exilis* are reported for the first time from Canada. Two species, *Hypotrachyna minarum* and *Usnea mutabilis* are reported for the first time from Ontario. The first contemporary Canadian collections of *Parmotrema subtinctorium* in over a century and *Punctelia borreri* in over 60 years are described. Details on twelve additional rare or otherwise rarely collected species in the province are also provided. These include *Candelaria fibrosa*, *Chaenotheca selvae, Chaenothecopsis ochroleuca* (on an unidentified sorediate crust), *Crespoa crozalsiana, Evernia prunastri, Dermatocarpon dolomiticum*, *Didymosphaeria oblitescens, Lepraria hodkinsoniana, Leptogium rivulare*, *Parmotrema stuppeum*, *Placynthium petersii* and *Teloschistes chrysophthalmus.* These new records demonstrate our biodiversity knowledge of the region is still very much incomplete, and that the area is an important refuge for lichen diversity not reported elsewhere in Canada. It also highlights the presence a novel lichen biota linked to introductions through the import of ornamental trees including *C. fibrosa*, *C. texana*, *E. prunastri*, *T. chrysophthalmus* and possibly *T. exilis.*

KEYWORDS. – Appalachian-Great Lakes Region, lichen distributions, lichen introductions, floristics, range extensions, rare species, *Canoparmelia*, *Gyalideopsis, Lemmopsis, Myelochroa metarevoluta*, *Parmotrema*, *Punctelia*, *Teloschistes*.

INTRODUCTION

The first two installments of this series reported new records and range extensions for lichens and allied fungi from Ontario with an emphasis on the Great Lakes Basin (Brinker 2020, 2023). Those works focused generally on areas of the southern Boreal and Great Lakes St. Lawrence Forest ecoregions. Here, I report additional species with few or no provincial records from areas of the Deciduous Forest Ecoregion as described by Hills (1959), Rowe (1972), and Soper (1955), known colloquially as the Carolinian Zone or the Banana Belt, which lies between the 41st and 43rd parallels (roughly the same latitude as the northern border of California).

The Carolinian Zone in Canada occurs in the extreme southwest corner of Ontario (Soper 1955). It extends from the United States border north to Toronto on Lake Ontario, and west to Grand Bend on Lake Huron (Fig. 1). It is bounded by four major lakes (Huron, St. Clair, Erie and Ontario), as well as the St. Clair, Detroit and Niagara Rivers. It encompasses less than 0.25% and 2.2% of Canada's and Ontario's landmasses respectively (Crins et al. 2009). The climate is one of the mildest in Canada with a mean annual temperature range of 6.3 to 9.4°C (Crins et al. 2009). Average annual precipitation is 776 to 1,018 mm, with a growing season of 217 to 243 days (Crins et al. 2009). The entire region is underlain by Silurian and Devonian limestone bedrock which outcrops with regularity only in a narrow band along the Niagara Escarpment, and a series of small shelving shorelines of the eastern Lake Erie basin (Chapman & Putnam

[1]SAMUEL R. BRINKER – Ontario Ministry of Natural Resources, Natural Heritage Information Centre, 300 Water St., Peterborough, Ontario, K9J 3C7, Canada – e-mail: sam.brinker@ontario.ca

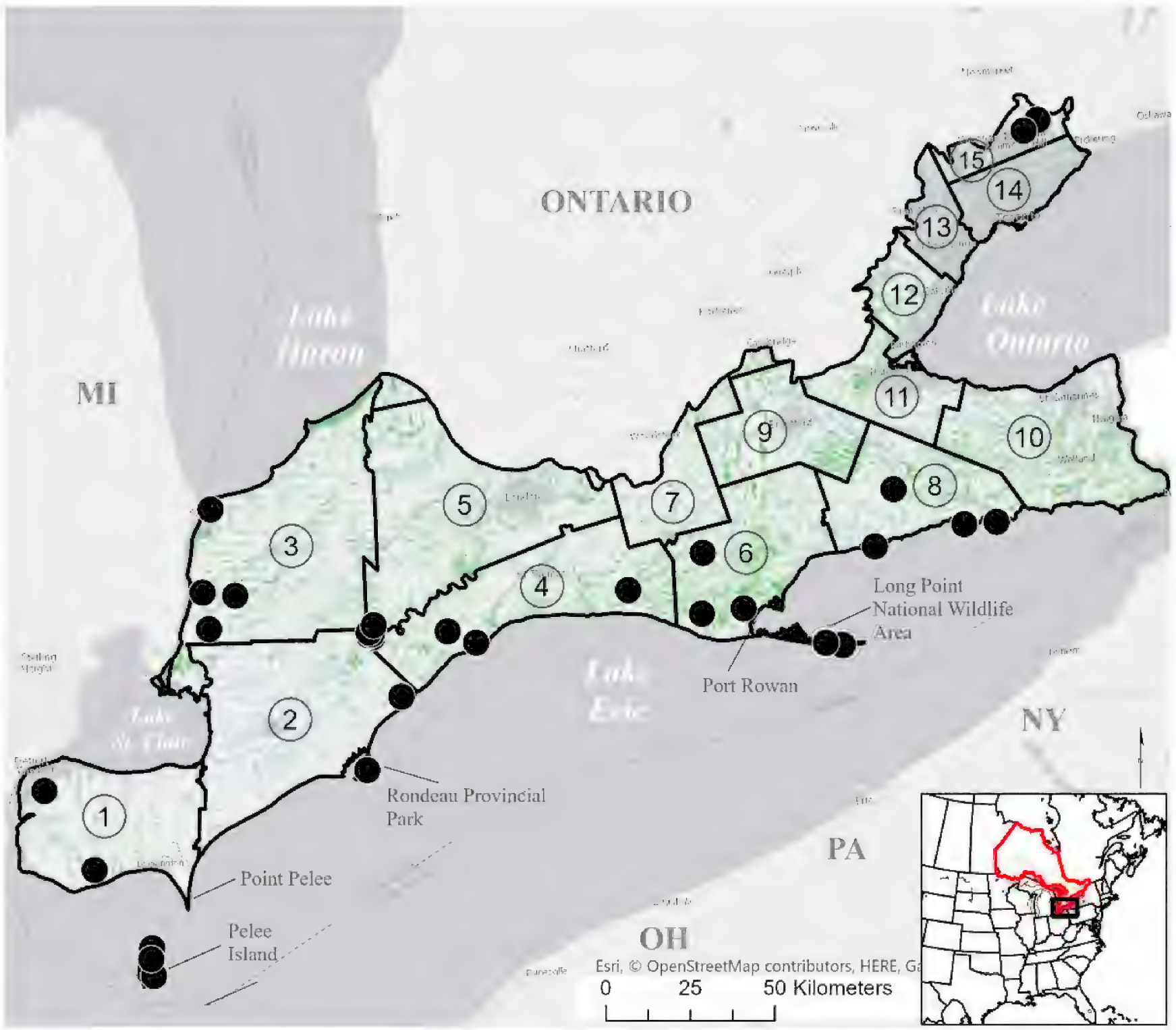

Figure 1. Collecting locations (●) of the author within counties occurring in the Carolinian Zone of southwestern Ontario that are cited in the text. Counties are numbered as follows: 1) Essex; 2) Chatham-Kent; 3) Lambton; 4) Elgin; 5) Middlesex; 6) Norfolk; 7) Oxford; 8) Haldimand; 9) Brant; 10) Niagara; 11) Hamilton; 12) Halton; 13) Peel; 14) Toronto; 15) York.

1984). Substrates are comprised primarily of calcareous mineral material with a minor component of the landscape composed of organic material (Chapman & Putnam 1984). The predominant soils include Gray Brown Luvisols (60%) and Gleysols (37%) (Crins et al. 2009). These substrates provide high to moderate capability to buffer the acidity of atmospheric depositions before it reaches surface water (Environment Canada 1988).

The region has experienced historic rates of habitat loss that are among the highest in Canada. Nearly all the remaining natural cover in the Carolinian Zone has been logged, drained/irrigated, cleared, polluted or otherwise disturbed by human activities at one time or another over the past few centuries (Jalava et al. 2000). Remaining habitat patches are generally small, highly fragmented, and often degraded, and natural areas tend to persist where feasibility of agricultural and urban development is generally poor (Crins et al. 2009). This trend is accelerating, as remaining natural areas are facing ever increasing pressure from development as the population of Ontario is projected to increase by 41% by 2051, with much of that growth occurring in the region (Ontario Ministry of Finance 2023). Less than 2.5% of the Carolinian Zone is formally protected (compared to more than 12% of central Ontario) (Jalava et al. 2015), with much of the land under private ownership.

The Carolinian Zone represents the northernmost edge of the Eastern Deciduous Forest in North America (Maycock 1963). It has long been regarded as a unique ecological region in Canada supporting habitat for species normally associated with comparably more southerly areas of the eastern United States

than Ontario, including many rare species found nowhere else in the country (Allen et al. 1990). For example, it provides habitat for over 40% of the Canadian plant species (Oldham 2017) and an estimated 50% of the federally listed species at risk (Environment Canada 2014). Despite being highlighted as a critical biodiversity hotspot in Canada (e.g., Allen et al. 1990, Klinkenberg 2002, Line et al. 1999, Muir et al. 2021), our knowledge of lichens in the Carolinian Zone remains incomplete.

Important early studies which focused on documenting lichen collections that covered portions of the Carolinian Zone were completed by Macoun (1902), Stewart (1976), and Wong and Brodo (1990, 1992). More recent work includes preliminary checklists compiled from various sources for areas of the Niagara Region (Olszewski 2010) which falls entirely within the Carolinian Zone, as well as the Greater Toronto Area (McMullin et al. 2018a), the Credit River Watershed (Maloles et al. 2018) and the Halton Region (Knight 2020) which only partially fall within the Carolinian Zone. Ecological studies of lichens in the region are limited but at least one assessed urban and rural lichen diversity along three sections of the Niagara Escarpment with locations in the Carolinian Zone at Hamilton and Niagara (McMullin et al. 2016). Nonetheless, systematic lichen surveys of key natural areas in the region are still lacking. Natural areas in the Carolinian Zone that have published lichen surveys include Middle Island (18 ha) in the western basin of Lake Erie consisting of nine species (Doubt & McMullin 2016) and portions of Rouge National Park in the Greater Toronto Area consisting of 124 species (McMullin et al. 2022). Recently though, several researchers have made noteworthy additions to the Canadian biota of lichens from the Carolinian Zone such as *Hypotrachyna showmanii* Hale, *Parmotrema hypotropum* (Nyl.) Hale, *Punctelia missouriensis* G. Wilh. & Ladd, and *P. perreticulata* (Räsänen) G. Wilh. & Ladd as part of general lichen surveys (Brinker 2020, 2023; Lewis 2014; Lewis & Brinker 2017; McMullin et al. 2015).

Over a period of roughly three years, the present author searched for species of southern affinity in interesting habitats of the Carolinian Zone, notable among them being maple (*Acer*) mineral deciduous swamps, hawthorn (*Crataegus*) cultural alvar woodland and Chinquapin Oak (*Quercus muehlenbergii*) treed alvar according to vegetation classification by Lee et al. (1998). These trips resulted in numerous discoveries of conspicuous macrolichens that have surprisingly gone unnoticed in the region reflecting our incomplete knowledge of the lichen biota here. The present contribution aims to highlight this knowledge gap and to report significant additions to the Ontario lichen biota.

MATERIALS AND METHODS

The study material was collected during routine floristic surveys carried out mainly between the years 2021 and 2024 in the Carolinian Zone of the Ontario Great Lakes Basin (Fig. 1). Specimens were examined dry using a Zeiss Stemi 2000-C dissecting microscope. Sections of the ascomata and thalli were made by hand using a razor blade, mounted in water, and examined using compound microscopes. All measurements and size ranges given are based on untreated water mounts and expressed as simple ranges. Chemistry was studied using standard spot tests and longwave UV following Brodo et al. (2001). Thin-layer chromatography of select specimens was generously conducted by James Lendemer in Solvents C or A (Lendemer 2011a). In cases where single individuals of rare species were encountered, only photographic vouchers were taken. These records are indicated as "photographic voucher" in the specimen citations and provided in a supplementary appendix.

Photographs were taken in one of two ways. Most were captured in the field using a Fujifilm X-T5 camera and Fujinon XF 80mm macro lens. The remainder were taken in the laboratory with a Leica Flexacam C3 camera attached to a Leica M125 dissecting microscope. Distribution maps were created using ESRI ArcMap 10.3.1 and data used to generate these maps were obtained from the Consortium of Lichen Herbaria (CLH 2024), the herbarium of the Canadian Museum of Nature and relevant literature for each species where verified records exist. Attempts were made to remove records that were considered likely the result of digitization errors or misidentifications. Herbarium codes follow Index Herbariorum (Thiers 2022), and specimens were deposited in the following herbaria: Canadian Museum of Nature (CANL), New York State Museum (NYS), as well as the private herbarium of the author (hb. Brinker).

RESULTS

A total of 25 species representing 20 genera are reported below, of which 11 are new to Ontario; eight are the first published records for Canada and one is the first for North America. Non-lichenized and lichenicolous fungi account for three species of the total reported here. Notes on an additional 14 lichens

and allied fungi that are rare or otherwise seldom reported from Ontario are also provided. The reports are presented in three lists according to significance: new to North America (***), new to Canada (**), new to Ontario (*), and additional noteworthy provincial/Great Lakes Basin collections. Within each list, the records are arranged alphabetically by genus and species. The notes presented for many species include details on the previously known North American distribution. Lichenicolous fungi are denoted by a dagger (†); nonlichenized fungi traditionally treated with lichens are denoted by a hashtag (#). Nomenclature follows Esslinger (2021).

SPECIES NEW TO NORTH AMERICA

***Lemmopsis pelodes* (Körb. ex Stein) T.L. Ellis

FIGURE 2.

DISCUSSION. – *Lemmopsis pelodes* is a very rarely reported ephemeral crustose terricolous cyanolichen that was until now known only from portions of Europe including Lithuania, Poland, Sweden (Jørgensen & Motiejūnaitė 2005), Finland (Pykälä 2007), the Netherlands (Aptroot et al. 2008), Belgium (Diederich et al. 2009) and Switzerland (Dietrich et al. 2022). It has been considered globally rare and possibly on the brink of extinction due to modern land use changes (e.g., industrial agriculture) in rural lowland areas since it is a pioneer species of bare clay soil with a low competitive ability (Motiejūnaitė 2012). Interestingly, the locations from which it has been discovered, are mostly associated with anthropogenically modified habitats including the type locality in Poland which was along a railroad (Stein 1879), and more recent records from disturbed areas along roadsides, trampled soils along pathways and in limestone quarries (Jørgensen & Motiejūnaitė 2005, Motiejūnaitė 2012). However, a recent record from Switzerland was discovered on humus associated with calcareous scree at high elevation (Dietrich et al. 2022) indicating the species is not exclusive to lowland regions with a long history of human occupation. During the present study, it was found on exposed, compacted calcareous clay growing with *Enchylium bachmanianum* (Fink) Otálora, P.M. Jørg. & Wedin at the edge of a small parking area in a remnant oak – hickory (*Quercus – Carya*) clayplain woodland. This new location broadens the distribution of the species considerably to include the Western Hemisphere where it may be overlooked.

The species can be recognized by its ecology, its small, granular blackish brown thallus that can coalesce into irregular areoles from 2–5 mm wide becoming gelatinous when wet, numerous apothecia with more or less granular thalline margins with orange discs, and simple, hyaline ellipsoid ascospores measuring 17–35 × 8–15 µm (Dietrich et al. 2022, Jørgensen 2012). Ascospores in the material cited below agreed with these sizes, ranging from 21.9–25.1 × 9.1–12.6 µm. It could be confused with other crustose terricolous cyanolichens to be expected from the study area such as *Enchylium limosum* (Ach.) Otálora, P.M. Jørg. & Wedin but can be readily distinguished from it and other terricolous members of *Collema* s.l. by the simple ascospores (Jørgensen 2012).

Specimen examined. – **CANADA. ONTARIO.** HALDIMAND CO.: Selkirk Provincial Park off Wheeler Rd., 3 km SW of the hamlet of Selkirk, edge of mature, remnant upland *Quercus rubra – Carya ovata* clay-plain woods, 23.v.2025, terricolous on exposed clay soil, *S.R. Brinker 11109* (CANL, hb. Brinker).

SPECIES NEW TO CANADA

**Canoparmelia texana* (Tuck.) Elix & Hale

FIGURES 3A & 3B.

DISCUSSION. – *Canoparmelia texana* is a pantropical to temperate species whose range in North America includes mainly the southeastern United States, the Ozarks, and portions of the Sonoran Desert Region (Brodo et al. 2001, Nash & Elix 2002a). Disjunct populations occur north of this main distribution in Ohio (Curtis 2019), Pennsylvania (Lendemer 2010) and Wisconsin (Thomson 2003), suggesting that it may be more widespread in eastern temperate areas than previously appreciated. Throughout its range, *C. texana* occurs in well-lit natural habitats as well as in urban habitats in its more southern range, where it can be found on tree bark or rarely rock (Kirika et al. 2022, Lendemer & Noell 2018). During the present study, it was found at the edge of a disturbed woods on well-lit bark of Green Ash (*Fraxinus pennsylvanica*) along the shoreline of Lake Erie as well as on an ornamental Red Maple (*Acer rubrum*) in a suburb of the City of Ottawa. While the latter occurrence is not naturally occurring and spontaneous, the

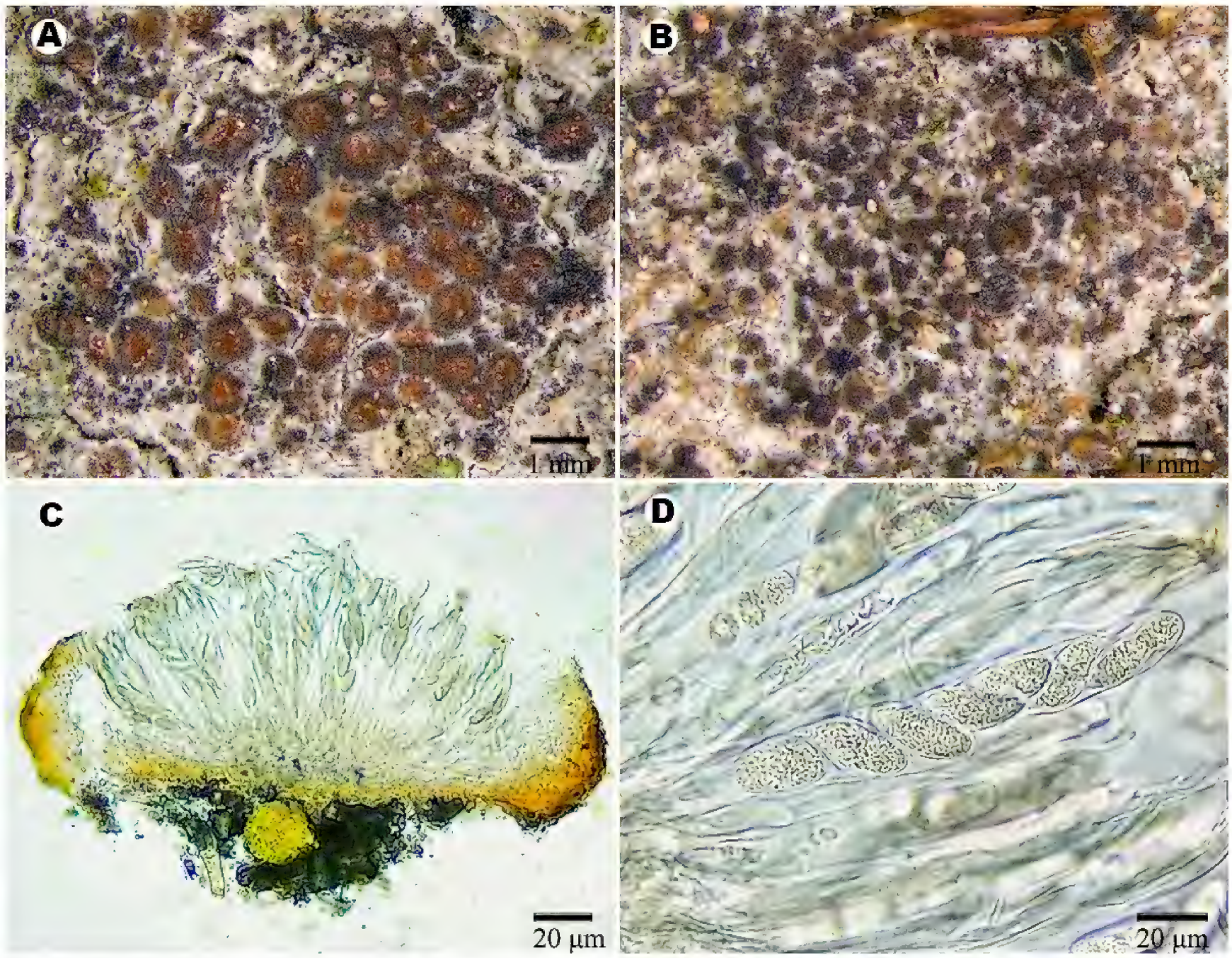

Figure 2. Morphology and anatomy of *Lemmopsis pelodes* newly reported for North America. **A,** overall habit with numerous apothecia growing on clay soil. **B,** scattered granular thallus with several juvenile apothecia. **C,** anatomy, section through mature apothecium with poorly developed thalline margin and open disc. **D,** detail of clavate ascus and simple, hyaline ellipsoid ascospores.

presence of *C. texana* along the Lake Erie shoreline on a tree at the edge of a naturally occurring woodland presumably is and appears to be the first record of a native occurrence from Canada. Unfortunately the tree has since succumbed to the effects of Emerald Ash Borer (*Agrilus planipennis*), a wood-boring beetle native to east Asia that is decimating ash (*Fraxinus*) trees in North America (Herms & McCullough 2014). In 2024, the tree was revisited and found to be dead and lying on the ground with most of the bark no longer present. The occurrence of *C. texana* on a commercially planted tree in Ottawa is well outside its expected range and presumably represents a recent introduction linked to importation of ornamental trees for the horticultural trade from further south.

Canoparmelia texana can be recognized by its appressed foliose thallus, pustular soralia that often become continuous on older thallus parts or where lobes have folded, dark underside, gray pseudocyphellate upper surface, and a medulla that is UV+ blue-white (due to the presence of divaricatic acid (Lendemer & Noell 2018). In Ontario, *C. texana* could be confused with several other macrolichens, particularly *Myelochroa aurulenta* (Tuck.) Elix & Hale and *Flavoparmelia caperata* (L.) Hale. *Myelochroa aurulenta* differs in having a yellow pigmented medulla that is UV-, its soredia which are often coarser, arising from irregularly shaped patches of laminal pustules (Lendemer & Noel 2018), and its typically looser attachment to substrates. *Flavoparmelia caperata* differs in having a yellow-green upper surface when dry, and in having a P+ orange-red medulla (due to the production of protocetraric acid) (Brodo et al. 2001). It is likely that in both urban and non-urban areas, *C. texana* has been overlooked and mistaken for *M. aurulenta* because the former species was presumed not to occur in Canada.

Specimens examined. – **CANADA. ONTARIO.** CITY OF OTTAWA: 17 km S of Ottawa city centre in suburb of Barrhaven, residential area with street trees along sidewalks, 27.xii.2024, corticolous on commercially planted *Acer rubrum*, *S.R. Brinker 11049* (NYS, !J. Lendemer). HALDIMAND CO.: James N. Allen Provincial Park, SW facing shore of Lake Erie, 34 km W of Port Colborne, edge of disturbed wet shoreline woods with *Fraxinus pennsylvanica*, *Acer negundo* and *Lonicera tatarica*, 21.iv.2019, corticolous on bark of *F. pennsylvanica*, *S.R. Brinker 7438* (NYS, !J. Lendemer).

****_Gyalideopsis moodyae_ Lendemer & Lücking**

FIGURES 3C & 3D.

DISCUSSION. – Since its original description from a single location in New Jersey (Lendemer & Lücking 2004), this taxon has been found to be more widespread in eastern North America ranging from Maine and Ohio through the Appalachian Mountains and the Mid-Atlantic states, west to the Ozark Ecoregion (Curtis 2019, Lendemer & Noell 2018, Lücking et al. 2007, Seaward et al. 2017). It has a distinctive ecology, occurring on ephemeral organic substrates in early stages of decomposition (such as tufts of grass, leaves or bryophytes) in semi-open habitats of both natural and disturbed areas (Lendemer & Noell 2018). Presently it is considered globally rare with a global rank of Critically Imperiled to Imperiled (G1G2) (NatureServe 2024), but this rank should be reviewed in light of its currently understood range and lack of readily identifiable threats. This is the first confirmed report of the species from Canada, and the genus *Gyalideopsis* Vězda is reported for the first time from Ontario. A query of CLH (2024) produced an unpublished collection from New Brunswick (*Buck 57677*, NY). In this study, it was found growing over small tufts of decomposing grass and detritus in a remnant sandy Black Oak (*Quercus velutina*)-dominated savannah. The author has also searched for it unsuccessfully in similar habitats in and near coastal areas of Lake Ontario and Lake Huron.

Gyalideopsis moodyae can be identified by its ecology, and the production of minute, light to dark brown hyphophores that are bent and expanded at the apex (Fig. 3C) over a thin, glossy greenish gray to blue-green UV- thallus covering organic matter (Lendemer & Lücking 2004). Apothecia were not observed in the material cited below, though when present, are lecideine, brownish-black, with a thin but distinct margin concolorous with the disc (Lendemer & Lücking 2004).

Specimen examined. – **CANADA. ONTARIO.** NORFOLK CO.: Turkey Point Provincial Park, 13 km SW of Simcoe, 2 km N of Lake Erie, opening in *Quercus velutina* oak savannah with scattered *Pinus strobus*, 20.viii.2024, on decaying tufts of grass over sandy soil, *S.R. Brinker 10754* (hb. Brinker).

****_Myelochroa metarevoluta_ (Asah.) Elix & Hale**

FIGURES 3E & 3F.

DISCUSSION. – *Myelochroa metarevoluta* is an east Asian–east North American disjunct (Hale 1976) whose northern limit appears to be the populations reported here. It is otherwise known from scattered localities in the Appalachians (Hale 1976; Lendemer 2007, 2010) north to Ohio (Curtis 2019). The occurrence in the most southerly part of Canada in the Deciduous Forest Region is an extension of this distribution (Fig. 3F). As has been summarized by previous authors (Flenniken 2004; Hale 1976; Lendemer 2007, 2010), this species is rare in North America and has a global rank of Imperiled (G2; NatureServe 2024). It has a distinctive ecology, usually occurring on tree and shrub branches along waterways with constant humidity (Lendemer 2010). Several populations were encountered on acidic bark of soft maples in high-quality mineral deciduous swamp forest as well as on conifer twigs in remnant forests near Lake Erie. These are the first reports of *M. metarevoluta* from Canada and the Great Lakes Basin where the species is likely rare and should be considered as a high priority species for a status assessment.

Myelochroa metarevoluta can easily be distinguished from the other sorediate *Myelochroa* species in North America (i.e., *M. aurulenta*) by its strictly capitate soralia confined to the tips of revolute lobes, and the P+ deep yellow reaction in the medulla from production of galbinic acid (Lendemer 2010). *Myelochroa aurulenta* differs in producing mainly laminal soralia that arise from the breakdown of pustules and has a P- medulla. It is most likely to be confused with *Hypotrachyna revoluta* (Flörke) Hale which also has capitate soralia, but has a P- medulla that is white (Lendemer & Allen 2020), whereas *M. metarevoluta* has a light-yellow pigmented medulla. In fact, the discovery of the species prompted the author to review two vouchers (with a small poorly developed thallus) cited below (*Brinker 9596, 9685*) that were reported as *H. revoluta* by Brinker (2023). Re-examination of these specimens revealed they were *M. metarevoluta*. There are no confirmed records of *H. revoluta* from Middlesex and Norfolk Counties at present.

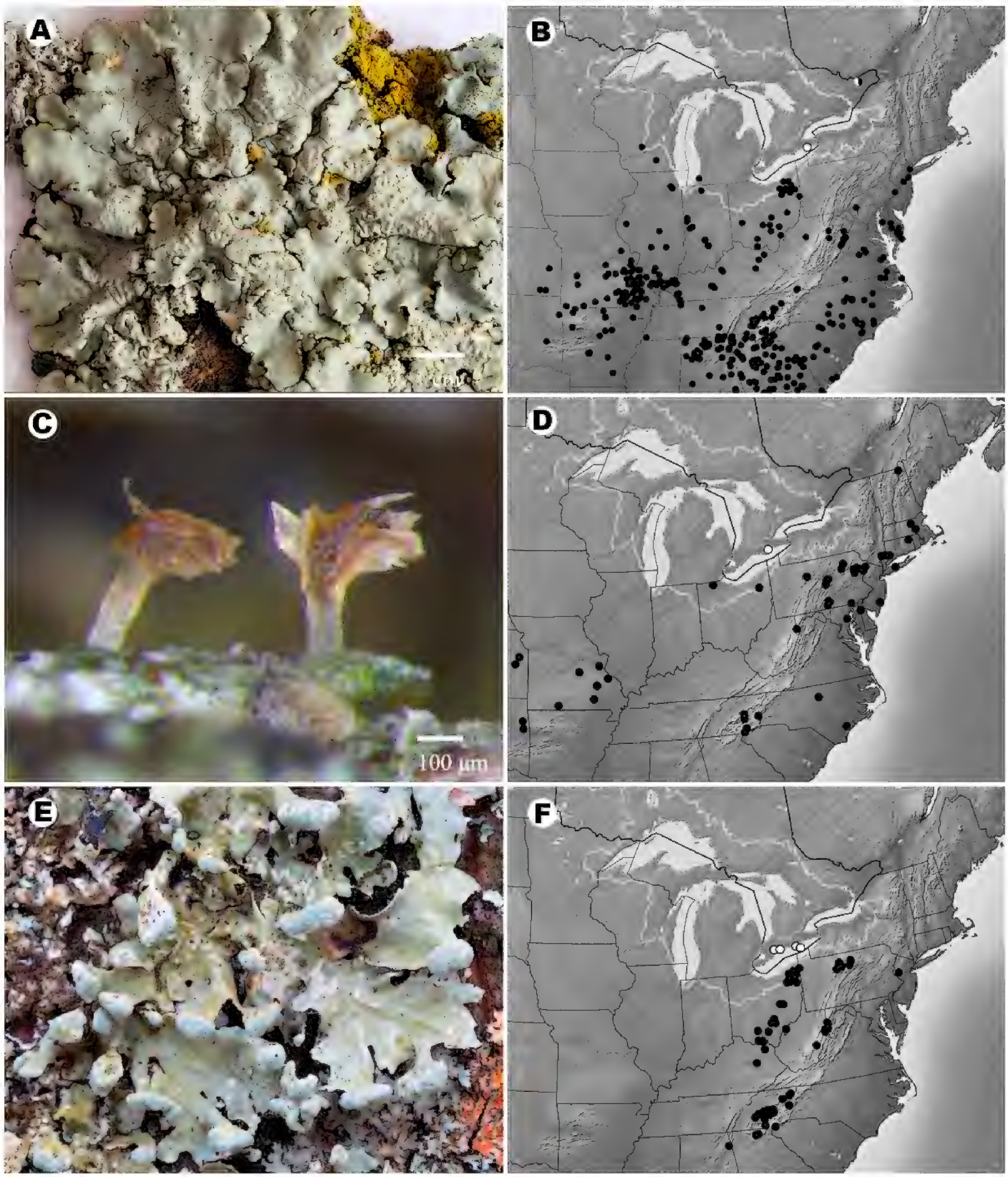

Figure 3. Photographs and distribution maps of lichens newly reported to Canada (○ = newly reported Ontario records, ● = previous collections, ◑ = newly reported adventive record). **A,** *Canoparmelia texana* (*Brinker 11049*). **B,** distribution of *C. texana* in eastern North America. C, *Gyalideopsis moodyae* (*Brinker 10754*). **D,** distribution of *G. moodyae* in eastern North America. **E,** *Myelochroa metarevoluta* on bark of *Acer ×freemanii* (photo taken in situ, scale not included *Brinker 10924*). **F,** distribution of *M. metarevoluta* in North America.

Specimens examined. – **CANADA. ONTARIO.** MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, mature deciduous swamp with *Acer* ×*freemanii*, *Ulmus americana* and *Cephalanthus occidentalis*, 8.xi.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9669* (hb. Brinker); 60 km SW of London, 17.5 km NE of Thamesville, deciduous swamp with *A.* ×*freemanii*, *U. americana* and *C. occidentalis*, 9.xi.2022, corticolous on bark of fallen *A.* ×*freemanii*, *S.R. Brinker 9685* (hb, Brinker). NORFOLK CO.: Backus Woods Natural Area, 12 km W of Turkey Point, 4 km N of Port Rowan, successional *Juglans nigra* and mixed conifer plantation with occasional opening, 24.ix.2022, ramicolous on twig, *S.R. Brinker 9596* (hb. Brinker); Long Point National Wildlife Area, Gravelly Bay, 30 km SE of Port Rowan, open *Larix laricina* coniferous swamp with *Ilex verticillata*, 5.vi.2025, ramicolous on twigs of *L. laricina*, *S.R. Brinker 11138* (CANL).

****Parmotrema austrosinense* (Zahlbr.) Hale**

FIGURES 4A & 4B.

DISCUSSION. – *Parmotrema austrosinense* is a widespread but infrequent species of lower central and southeastern North America with a primary range from Texas and Mississippi north to Missouri, with localized occurrences also in coastal areas of California (Brodo et al. 2001). More recently it has been documented outside this range in New Jersey (Waters & Lendemer 2019) and Ohio (Curtis 2019). These are the first reports from Canada and appear to be the northernmost native occurrences in North America (Fig. 4B). The collection mapped from Connecticut was from a honey locust cultivar (*Gleditsia triacanthos* var. *inermis*) not native to the region (Frye et al. 2021). In the study area, it occurred with other notable lichens such as *Crespoa crozalsiana* (B. de Lesd. ex Harm.) Lendemer & Hodk., *Hypotrachyna showmanii*, *Myelochroa metarevoluta*, *Parmotrema reticulatum* (Taylor) M. Choisy, *Punctelia missouriensis* and *P. borreri* (Sm.) Krog.

Parmotrema austrosinense can best be differentiated from similar species of *Parmotrema* based on the C+ red and KC+ red medulla (due to the presence of lecanoric acid), as well as its pale gray thallus with erect, undulating, eciliate lobes with fine, elongate, marginal soralia (Brodo et al. 2001). In Ontario, it is most likely to be confused with *Parmotrema hypotropum* (Nyl.) Hale which occurs with it but has a medulla that is K+ yellow turning red-orange and P+ yellow or orange (due to the presence of norstictic acid), (Lendemer & Noel 2018). *Parmotrema hypotropum* also normally has more abundant black marginal cilia and coarser marginal soralia (Brodo et al. 2001). *Parmotrema stuppeum* which also has narrowly marginal soralia and erect, ruffled marginal lobes has recently been documented from the Carolinian Zone (this study). It is distinct from *P. austrosinense* in having a K+ red and P+ orange medulla (due to the presence of salazinic acid), as well as a broad marginal zone on the undersides that is shiny brown rather than white and sparse marginal cilia on the lobes (Brodo et al. 2001).

Specimens examined. – **CANADA. ONTARIO.** ESSEX CO.: Lake Erie, Pelee Island, Florian Diamante Nature Reserve, regenerating shallow-soiled over limestone thicket with *Cornus drummondii*, *Zanthoxylum americanum*, *Crataegus* spp. and *Juglans nigra*, 11.xi.2024, corticolous on bark of *C. drummondii*, *S.R. Brinker 11000* (CANL). NORFOLK CO.: Backus Woods Natural Area, 12 km W of Turkey Point, 4 km N of Port Rowan, successional *J. nigra* and mixed conifer plantation with occasional openings, 1.ii.2025, ramicolous on twigs of *P. glauca*, *S.R. Brinker 11056* (hb. Brinker); Long Point National Wildlife Area, Gravelly Bay, 30 km SE of Port Rowan, open *Larix laricina* coniferous swamp with *Ilex verticillata*, 5.vi.2025, ramicolous on twigs of *L. laricina*, *S.R. Brinker 11137* (CANL).

****Parmotrema gardneri* (Dodge) Serus.**

FIGURES 4C & 4D.

DISCUSSION. – *Parmotrema gardneri* is widespread in southeastern North America from the Mid-Atlantic states of the Coastal Plain through low elevations of the Appalachian Mountains and the Ozarks (Harris & Ladd 2005, Hodkinson 2010, Lendemer & Noell 2018). It is also known from a few scattered localities north of this range in Ohio (Andreas et al. 2007), New Jersey (Waters & Lendemer 2019) and Pennsylvania (Lendemer 2009). An unpublished record also exists from southern Wisconsin (*Thomson 5210*, WIS) according to a query of CLH (2024), although *P. gardneri* was not reported from that state by Thomson (2003). It occurs on well-lit bark and branches of hardwoods in exposed to lightly shaded conditions in a wide range of habitats (Harris & Ladd 2005). The collections reported here represent the most northerly occurrences in North America (Fig. 4D) and are the first for Canada. The species was found in mature, humid deciduous swamp habitat on the bark of soft maples. The discovery of a small population

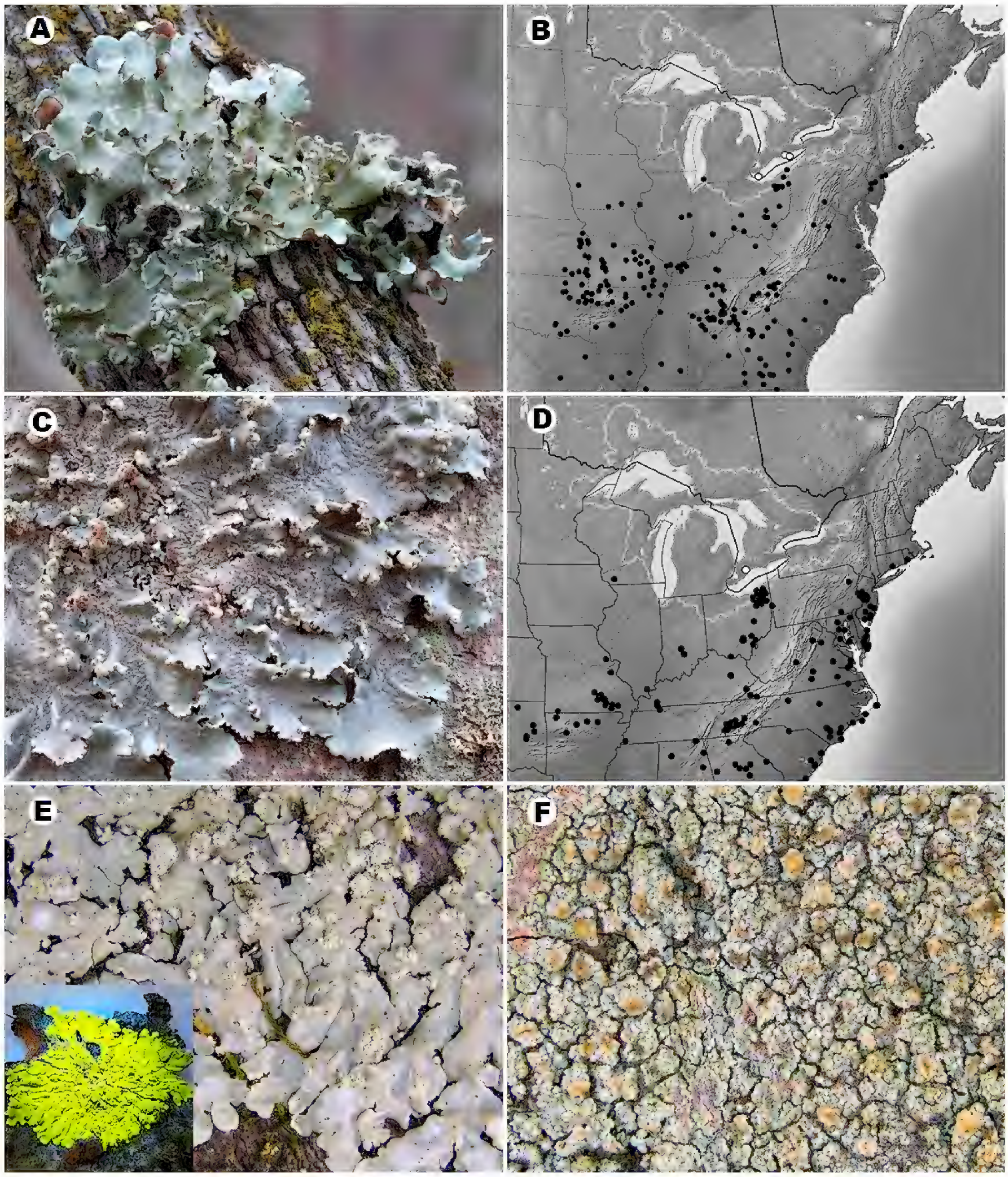

Figure 4. Photographs and distribution maps of lichens newly reported to Canada (white = newly reported Ontario records, black = previous collections). **A,** *Parmotrema austrosinense* (photo taken in situ, scale not included, *Brinker 11000*). **B,** distribution of *P. austrosinense* in eastern North America. **C,** *Parmotrema gardneri* (photo taken in situ, scale not included, *Brinker 10961*). **D,** distribution of *P. gardneri* in eastern North America. **E,** *Pyxine subcinerea* on bark of *Acer ×freemanii* (photo taken in situ, scale not included, *Brinker 9702*) with inset showing UV+ yellow reaction. **F,** *Scoliciosporum pensylvanicum* (photo taken in situ, scale not included, *Brinker 10923*).

in southwestern Ontario suggests that this species is likely very rare here where it seems to be confined to mature deciduous swamp forest.

Parmotrema gardneri can be distinguished by its adnate lobes, sparse marginal cilia, discrete capitate soralia, and containing protocetraric acid (medulla C-, KC+ pink, P+ red) but lacking echinocarpic acid (K-) (Brodo 2016). In Ontario, it is most likely to be confused with *P. perlatum* or *P. reticulatum*, both of which can have adnate lobes and capitate soralia. *Parmotrema perlatum* differs from *P. gardneri* by its typically looser attachment to its substate, and its chemistry, with a medulla that is PD+ orange and K+ yellow (due to the presence of stictic acid) (Hinds & Hinds 2007). *Parmotrema reticulatum* can be distinguished from *P. gardneri* by the reticulate pattern of maculae that become a pattern of cracks on the upper surface of the lobes, and a K+ yellow turning red and P+ orange medulla (due to the presence of salazinic acid) (Lendemer & Noel 2018).

Specimens examined. – **CANADA. ONTARIO.** MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, mature deciduous swamp with *Acer* ×*freemanii*, *Ulmus americana*, *Cephalanthus occidentalis* and *Lindera benzoin*, 9.xi.2022, corticolous on bark of *A.* ×*freemanii*. *S.R. Brinker 9688* (NYS, hb. Brinker; det. J. Lendemer); Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, deciduous swamp with *A.* ×*freemanii*, *U. americana*, *C. occidentalis*, 24.x.2024, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 10961* (hb. Brinker).

***Pyxine subcinerea* Stirton**

FIGURE 4E.

DISCUSSION. – *Pyxine subcinerea* occurs on hardwoods and conifers in a diverse array of low-elevation forested and open habitats in temperate and subtropical regions of North America. It ranges from Texas and the southeastern Great Plains to New York and west to Illinois (Amtoft 2002). Though these are the first reports of this species from Canada, its discovery is not unexpected. Here, it was found in a range of forested and park-like habitats in the southern portion of the Carolinian Zone where it will likely turn out to be more widespread with additional search effort.

Pyxine subcinerea can be distinguished by its UV+ yellow upper surface owing to the presence of lichexanthone, discrete laminal soralia and pruinose lobe tips (Amtoft 2002). *Pyxine sorediata* (Ach.) Mont. is the only other species of *Pyxine* present in Ontario, ranging through much of the province north to the southern boreal forest and can be differentiated by having soredia produced on lobe tips and a UV- upper surface (Brodo et al. 2001).

Specimens examined. – **CANADA. ONTARIO**. ELGIN CO.: Dutton Swamp, 4 km SW of Dutton, successional swamp forest with *Acer* ×*freemanii* and *Populus deltoides*, 22.x.2024, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 10910* (hb. Brinker). ESSEX CO.: Lasalle, Brunet Park S of Windsor, manicured parkland with scattered trees, 20.ix.2024, corticolous on bark of *Pinus nigra*, *S.R. Brinker 10782* (CANL); Lake Erie, Pelee Island, Florian Diamante Nature Reserve W of Middle Point, regenerating shallow-soiled over limestone thicket with *Cornus drummondii*, *Zanthoxylum americanum*, *Crataegus* spp. and *Juglans nigra*, 13.xi.2024, corticolous on bark of *C. drummondii*, *S.R. Brinker 11020* (CANL). LAMBTON CO.: McKellar Wildlife Area, 20 km NNE of Wallaceburg, 14.5 km W of Oil Springs, lowland deciduous forest on clay plain with *A.* ×*freemanii* and *Quercus* spp., 11.xi.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9702 (hb. Brinker)*. NORFOLK CO.: Courtland Swamp 10 km SE of Tillsonburg, 7 km W of Lynedoch, deciduous swamp with *A.* ×*freemanii*, *Ulmus americana*, and *Lindera benzoin*, 22.v.2025, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 11102* (CANL).

***Scoliciosporum pensylvanicum* R.C. Harris**

FIGURE 4F.

DISCUSSION. – This species was only recently described from material collected in Pennsylvania (Harris 2009) and has since been found at scattered localities throughout temperate areas of eastern North America where it occurs on tree bark in moist forests (Harris 2009, Lendemer 2017, Tripp & Lendemer 2020). During the present study it was found on the smooth bark of Freeman's Maple (*Acer* ×*freemanii*) in several humid, seasonally wet forests. The records cited below are the first for Canada and appear to be the most northerly occurrences in North America. It may be more widespread in southern Ontario and likely overlooked because of its inconspicuous greenish-brown crustose thallus that resembles leprarioid crusts or algal colonies. It can be recognized by its granular, esorediate leprose thallus that is KC+ fleeting purple

and UV+ bright blue-white (due to the presence of lobaric acid), and small, pale-brown to reddish-brown biatorine apothecia with needle-shaped colourless ascospores (Harris 2009).

Specimens examined. – **CANADA. ONTARIO.** ELGIN CO.: Calton Swamp, 9 km SE of Aylmer, deciduous swamp with *Acer* ×*freemanii* and *Ulmus americana*, 25.x.2024, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 10971* (CANL). MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, mature deciduous swamp with *A.* ×*freemanii*, *U. americana* and *Lindera benzoin*, 8.xi.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9671* (CANL, hb. Brinker); Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, mature deciduous swamp with *A.* ×*freemanii* and *U. americana*, 23.x.2024, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 10923* (CANL).

***Teloschistes exilis* (Michaux) Vain.**

FIGURES 5A &5B.

DISCUSSION. – *Teloschistes exilis* is a conspicuous macrolichen widely distributed through portions of Africa, the West Indies, Central America, and South America (Almborn 1989). In North America it ranges from northern Florida west to Texas, as well as coastal areas of California, where it occurs on well-lit branches of trees in open woodlands (Brodo et al. 2001). This is the first report from Canada and the first for the Great Lakes Basin. The species was initially found by Sharon Nethercott who posted an observation of it on iNaturalist (https://www.inaturalist.org/observations/193352053). Its presence here, well north of its documented range, is surprising. It is possible that it arrived via transplanted nursery stock grown somewhere further south. The role of nurseries and commercial plantings of ornamental trees in translocating lichens outside of their native ranges in North America has been documented elsewhere (e.g., Brodo et al. 2007, 2021a; Frye et al. 2021; Waters & Lendemer 2019) and needs further study.

This new record, which is represented by a single thallus, occurred on what appeared to be a well-established non-native *Berberis* shrub growing with *Physcia adscendens* (Th. Fr.) H. Olivier and *P. millegrana* Degel. in a manicured urban park intermixed with semi-natural habitats. Unlike other examples of lichens that are clearly adventive, this individual did not occur with other lichens that seemed out of place, nor did it occur on a tree trunk that was of commercial origin from the landscape trade. It is unclear if this shrub was intentionally planted or whether it became established on its own means. Shrubby *Berberis* species are aggressive invasive plants in eastern North America (e.g., Mitchell & Simkovic 2024, Silander & Klepeis 1999) which commonly spread into natural areas. Whether the presence of *T. exilis* here is the result of a natural dispersal event or not can only be speculated upon.

Specimen examined. – **CANADA. ONTARIO.** LAMBTON CO.: City of Sarnia, 43 km N of Wallaceburg, Cantara Park, urban park with manicured parkland and remnant woods and thickets, 19.iv.2024, ramicolous on twig of *Berberis* sp., *S.R. Brinker et al. 10464* (photographic voucher, Fig. 9A; CANL).

SPECIES NEW TO ONTARIO

***Hypotrachyna minarum* (Vain.) Krog & Swinsc.**

FIGURES 5C & 5D.

DISCUSSION. – *Hypotrachyna minarum* appears to be widespread in eastern North America ranging from Pennsylvania and Ohio west to Illinois and Arkansas, south to central Florida (Brodo et al. 2001, as *Parmelinopsis minarum* (Vain.) Elix & Hale). In Canada, a disjunct population is known from Nova Scotia where the species was found in humid forests (Clayden 2010, as *P. minarum*). The collections cited here are the first reports from Ontario. It appears to be rather local in the region, where it occurs in humid forests or open woods in partial shade on twigs and tree bark. It is the only isidiate *Hypotrachyna* species in North America that has a C+ pink medulla other than the recently described *H. appalachensis* Lendemer & J.L. Allen, which requires TLC to separate. Although both species contain gyrophoric acid, *H. appalachensis* also produces 4,5-di-O-methylhiascic acid (Lendemer & Allen 2020). The latter species, however, has a very narrow distribution confined to the southern Appalachian Mountains and is not known to occur in the Northeast or Canada.

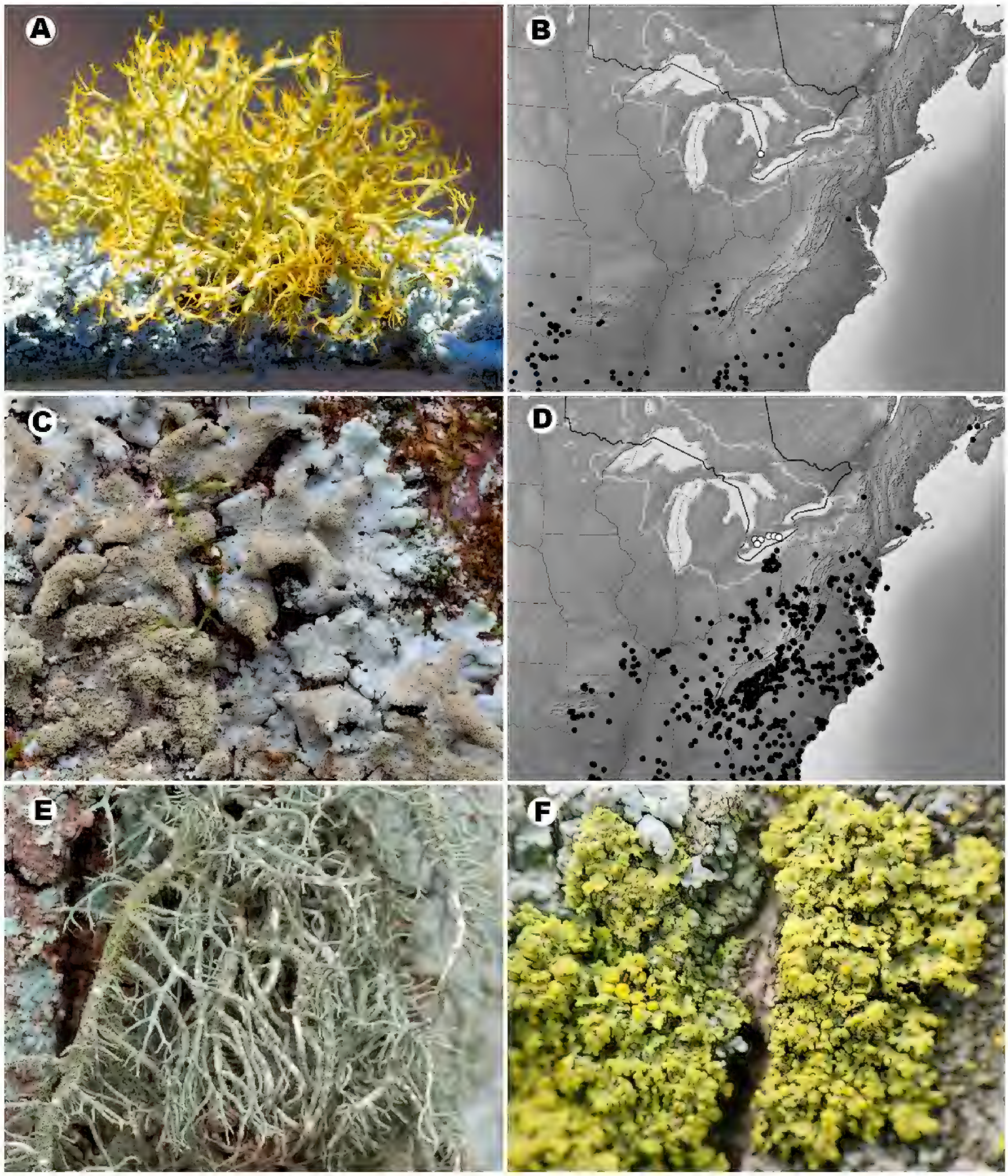

Figure 5. Photographs and distribution maps of lichens newly reported from Canada or Ontario (white = newly reported Ontario records, black = previous collections). **A,** *Teloschistes exilis* (photo taken in situ, scale not included, *Brinker 10464*). **B,** distribution of *T. exilis* in eastern North America. **C,** *Hypotrachyna minarum* (photo taken in situ, scale not included, *Brinker 10932*). **D,** distribution of *H. minarum* in eastern North America. **E,** *Usnea mutabilis* (photo taken in situ, scale not included, *Brinker 10931*). **F,** *Candelaria fibrosa* on planted ornamental tree (photo taken in situ, scale not included, *Brinker 10467*).

Specimens examined. – **CANADA. ONTARIO.** CHATHAM-KENT CO.: Clear Creek Forest Provincial Park, 14 km ENE of Ridgetown, deciduous thicket with *Crataegus* spp., *Cornus drummondii*, and *Juglans nigra*, 23.x.2024, corticolous on bark of *Crataegus* sp., *S.R. Brinker 10943* (hb. Brinker). ELGIN CO.: John. E. Pearce Provincial Park, 22 km ESE of Port Stanley, disturbed woods with *J. nigra*, *Robinia pseudoacacia* and *Picea abies*, 3.viii.2023, corticolous on bark of *P. abies*, *S.R. Brinker 10104* (CANL); Clear Creek Forest, 22 km SE of Thamesville, *Crataegus* spp. dominated thicket with young *Acer saccharum* and *J. nigra*, 22.x.2024, corticolous on bark of *Crataegus* sp., *S.R. Brinker 10918* (CANL); Calton Swamp, 9 km SE of Aylmer, deciduous swamp with *A.* ×*freemanii* and *Ulmus americana*, 25.x.2024, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 10972* (CANL). MIDDLESEX CO.: Skunks Misery, 18 km W of West Lorne, 4.5 km S of Newbury, mineral deciduous swamp with *A.* ×*freemanii*, *U. americana* and *Quercus bicolor*, 23.ix.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9588* (CANL, hb. Brinker); Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, mature deciduous swamp with *A.* ×*freemanii*, *U. americana* and *Lindera benzoin*, 8.xi.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9673* (NY, hb. Brinker; conf. J. Lendemer); mature deciduous swamp with *A.* ×*freemanii*, *U. americana*, *Cephalanthus occidentalis* and *L. benzoin*, 9.xi.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9689* (CANL). NORFOLK CO.: Backus Woods Natural Area, 12 km W of Turkey Point, 4 km N of Port Rowan, successional *J. nigra* and mixed conifer plantation with occasional openings, 1.ii.2025, ramicolous on twigs of *P. glauca*, *S.R. Brinker 11057* (hb. Brinker); Courtland Swamp 10 km SE of Tillsonburg, 7 km W of Lynedoch, deciduous swamp with *A.* ×*freemanii*, *U. americana*, and *L. benzoin*, 22.v.2025, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 11102* (CANL); Long Point National Wildlife Area, Gravelly Bay, 30 km SE of Port Rowan, open *Larix laricina* coniferous swamp with *Ilex verticillata*, 5.vi.2025, ramicolous on twigs of *L. laricina*, *S.R. Brinker 11136* (CANL).

***Usnea mutabilis* Stirton**

FIGURE 5E.

DISCUSSION. – *Usnea mutabilis* is widespread throughout temperate and subtropical eastern North America where it occurs mainly on the bark of hardwoods in a variety of upland and lowland treed habitats (Brodo et al. 2001). The occurrences reported here are the first published records of the species from Ontario. A search of CNL (2024) resulted in one previous historical collection made in 1898 from Kingston (Fowler s.n., FH) that was identified as *U. mutabilis* by A.C.T.W. Herre but does not appear to be referenced in any previous literature. Modern records of *Usnea* in the Carolinian Zone are extremely rare, with declines noted in the literature due to poor air quality and loss of mature forest habitat in the region (e.g., Wong & Brodo 1992). The presence of *U. mutabilis* in remnant humid swamp forests here is particularly noteworthy. It can be separated from other *Usnea* species in Ontario by its shrubby, isidiate, fruticose thallus with a pink medulla and relatively thin (8-18%) medulla (Brodo et al. 2001). *Usnea ceratina* Ach. looks superficially similar though it has conspicuous whiteish warts or tubercules on the surfaces of the branches, a proportionally thick medulla (20-30%), and unlike *U. mutabilis*, contains diffractaic acid (Brodo et al. 2001).

Specimens examined. – **CANADA. ONTARIO.** MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, mature deciduous swamp with *Acer* ×*freemanii*, *Ulmus americana* and *Lindera benzoin*, 8.xi.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9692* (hb. Brinker); Sitler Woods, 59 km SW of London, 17.5 km NE of Thamesville, deciduous swamp with *A.* ×*freemanii*, *U. americana* and *Cephalanthus occidentalis*, 24.x.2024, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 10957* (hb. Brinker). NORFOLK CO.: Long Point National Wildlife Area, Gravelly Bay, 30 km SE of Port Rowan, open *Larix laricina* coniferous swamp with *Ilex verticillata*, 5.vi.2025, ramicolous on twig of *L. laricina*, *S.R. Brinker 11135* (hb. Brinker).

ADDITIONAL INTERESTING OR SIGNIFICANT RECORDS

***Candelaria fibrosa* (Fr.) Müll.Arg.**

FIGURE 5F.

DISCUSSION. – *Candelaria fibrosa* is a widespread macrolichen found throughout portions of eastern and central North America but avoiding areas of the southeastern Coastal Plain, where it is a characteristic bark and twig dwelling species in well-lit habitats (Brodo et al. 2001). In areas of its eastern distribution, it appears to have experienced historical declines, having been more common than it is now

based on herbarium specimens, particularly in southern Ontario where few collections have been made in recent times possibly due to sensitivity to air pollution (Brodo et al. 2001). During the present study, several thalli were found in a heavily urbanized area on a few intentionally planted soft maples along with a suite of epiphytic macrolichens absent from other surrounding, larger, more established ornamental trees including: *Evernia prunastri* (L.) Ach., *Hyperphyscia adglutinata* (Flörke) H. Mayrh. & Poelt, *H. syncolla* (Tuck. ex Nyl.) Kalb, *Myelochroa galbina* (Ach.) Elix & Hale, *Parmotrema reticulatum*, *Punctelia bolliana* and *Xanthoria parietina* (L.) Th. Fr. These individuals likely represent an introduction within a plausible native range via the horticulture trade on ornamental trees. The author also discovered a small population in Long Point National Wildlife Area in a remnant coastal Eastern Cottonwood (*Populus deltoides*) treed sand dune where it appears to represent the first native occurrence from the Carolinian Zone.

The species can be easily recognized by its lemon-yellow esorediate thallus typically producing apothecia, white undersides with white rhizines, producing calycin and pulvinic dilactone (all spot tests negative) (Hinds & Hinds 2007). *Candelaria concolor* (Dickson) B. Stein is similar looking and much more common and widespread, but it is sorediate and often lacks apothecia. Shaded, or otherwise stressed thalli of *C. fibrosa* sometimes lack apothecia and may appear pale, leading to potential confusion with *Polycauliona polycarpa* (Hoffm.) Frödén, Arup & Søchting or corticolous species of *Xanthomendoza* S.Y. Kondr. & Kärnefelt. However both *P. polycarpa* and members of *Xanthomendoza* produce a K+ purple reaction in their cortex (Brodo 2016).

Specimens examined. – **CANADA. ONTARIO.** NORFOLK CO.: Long Point National Wildlife Area, outer Long Point 25 km SE of Port Rowan, Lake Erie, *Populus deltoides* treed sand dune with *Ammophila breviligulata*, 4.vi.2025, corticolous on bark of *P. deltoides*, *S.R. Brinker 11122* (hb. Brinker). YORK CO.: City of Markham, E of McCowan Rd., extensive urban area with subdivisions, manicured parks and planted ornamental trees, 24.iv.2024, corticolous on bark of several commercially planted *Acer* sp., *S.R. Brinker 10467* (CANL).

†*Chaenotheca selvae* Maloles & McMullin

FIGURE 6A.

DISCUSSION. – *Chaenotheca selvae* was only recently described by McMullin et al. (2018b) from Wellington County, Ontario where it was found at two locations on lignum of deciduous tree stumps in mature, treed wetlands. It has more recently been reported elsewhere in Canada from Alberta and Nova Scotia (Selva et al. 2023). During the present study the species was found in mature deciduous swamp habitat with standing water on a very large decaying maple snag, an ecology very similar to that found at the type location. The specimen cited below extends its range in Ontario south to the Carolinian Zone. *Chaenotheca selvae* is distinct in the genus in having an immersed thallus with *Stichococus* as a photobiont, a mazaedium with an orange-brown pruina, apothecia with straight stalks typically <1.0 mm tall with upper stalks that react K+ violet-red, and small ascospores that are 3.0–3.6 µm in diameter and lack ornamentation (Selva et al. 2023).

Specimen examined. – **CANADA. ONTARIO.** MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, edge of open water in flooded deciduous swamp with dead-standing snags ringed with *Acer* ×*freemanii*, surrounded by lowland deciduous forest, 8.xi.2022, lignicolous on large dead standing snag, *S.R. Brinker 9677* (hb. Brinker).

†*Chaenothecopsis ochroleuca* (Körb.) Tibell & K. Ryman

FIGURES 6B & 6C.

DISCUSSION. – The majority of North America reports of *Chaenothecopsis ochroleuca* are western, occurring from Alaska and British Columbia south through Washington to Idaho, and east to Alberta (Dillman et al. 2010, Hardman et al. 2023, McCune 2017, Selva & Tibell 1999). It also occurs more sporadically in eastern North America with scattered records from Maine, Minnesota, New York, and Ohio (Curtis 2019, Gockman et al. 2020, Paquette et al. 2020). It was recently reported for Ontario from Algonquin Provincial Park (Lewis et al. 2023). This is only the second record for Ontario and the first from the Great Lakes Basin (Fig. 6C). It apparently has a host restriction to sorediate crustose lichens on acidic bark of trees or rarely on rock, with several mentioned in the literature including *Lecanora thysanophora* Harris (Gockman et al. 2020), *Cliostomum* Fr. sp., and *Haemotomma ochroleucum* (Necker) J.R. Laundon

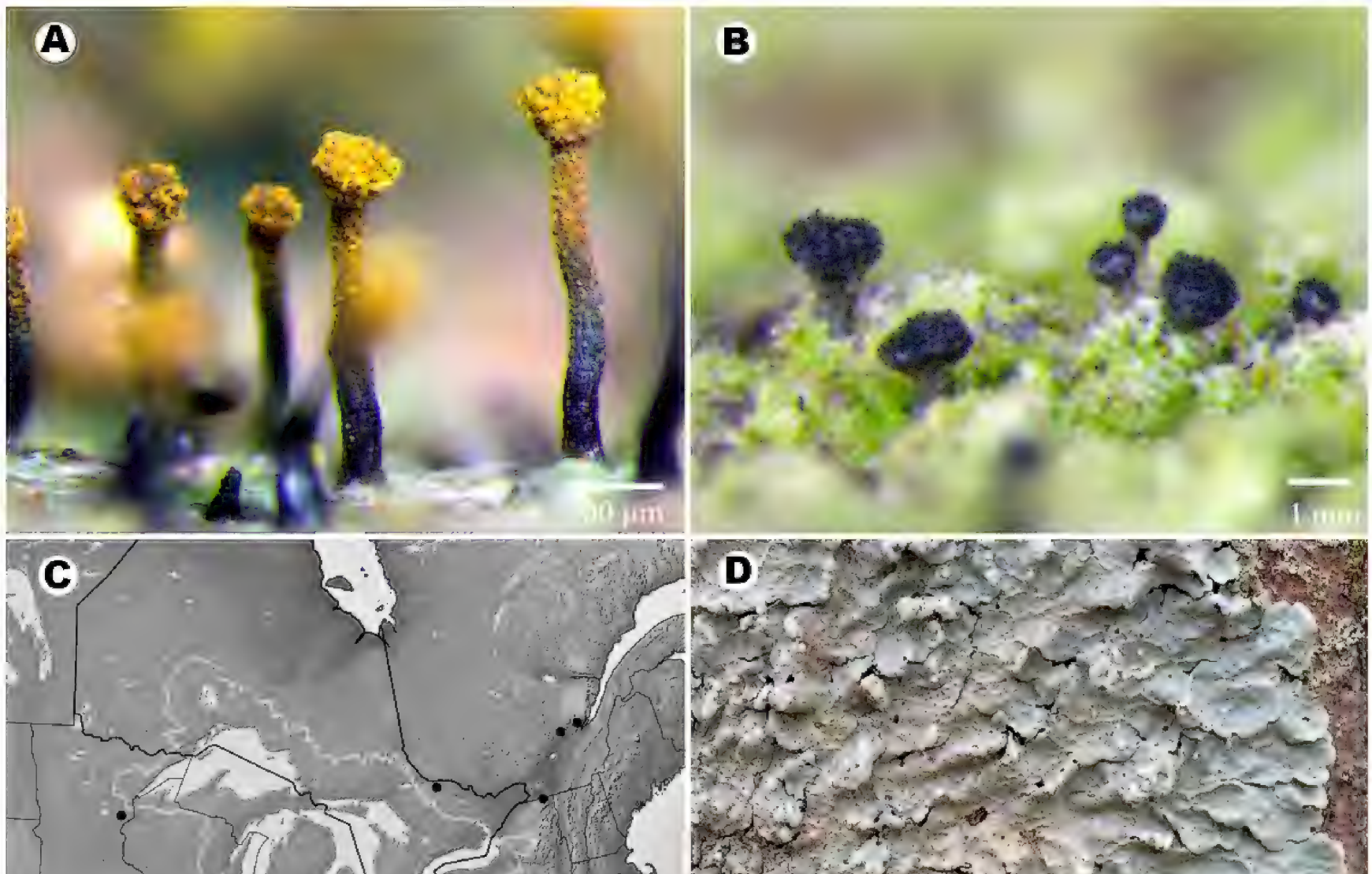

Figure 6. Photographs and distribution maps of lichens and allied fungi rarely reported from Ontario (white = newly reported Ontario records, black = previous collections). **A,** *Chaenotheca selvae* (*Brinker 9677*). **B,** *Chaenothecopsis ochroleuca* (*Brinker 10792*). **C,** distribution of *C. ochroleuca* in eastern North America. **D,** *Crespoa crozalsiana* (photo taken in situ, scale not included, *Brinker 10945*). **E,** *Dermatocarpon dolomiticum* on limestone (photo taken in situ, scale not included, *Brinker 10450*). **F,** *Didymosphaeria oblitescens* on bark of *Carya ovata* (*Brinker 11003*).

(Dillman et al. 2010). *Chaenothecopsis ochroleuca* can be identified by its ecology, short-stalked apothecia with white-pruinose stalks and black apothecia that react K+ green and red simultaneously, and dark, non-septate fusiform spores measuring (6.1–)6.9–8.7(–10.8) × (3.2–)3.7–4.5(–4.9) µm (Selva & Tibell 1999).

Specimen examined. – **CANADA. ONTARIO.** HALDIMAND CO.: Taquanyah Conservation Area, 13 km S of Caledonia, 4 km E of Cayuga, edge of vernal pond in deciduous *Quercus* – *Carya* clay plain forest with *Acer* ×*freemanii*, 21.ix.2024, lichenicolous on unidentified sorediate crust on bark of *A.* ×*freemanii*, *S.R. Brinker 10792* (hb. Brinker).

***Crespoa crozalsiana* (B. de Lesd. ex Harm.) Lendemer & Hodk.**

FIGURE 6D.

DISCUSSION. – *Crespoa crozalsiana* is an infrequent but widespread species in temperate eastern North America ranging from the Ozark Ecoregion and the Atlantic Coastal Plain north to the southern Great Lakes Basin where it occurs primarily on the bark of hardwoods (Harris & Ladd 2005, Lendemer & Noell 2018). It was only recently reported for Canada from a single location in the City of Hamilton by McMullin et al. (2021), and while this paper was in press it was reported from southern Québec (Lavoie et al. 2024) and the Ottawa region (Brodo et al. 2025). During the present study it was found on twigs and bark of a variety of hardwoods and shrubs and was occasionally locally common such as on Pelee Island and Skunks Misery. The records cited below from six new southern Ontario counties expand its distribution to include the Carolinian Zone where it occurs in well-lit humid habitats.

Crespoa crozalsiana is characterized by its blue-gray foliose thallus that reacts PD+ orange and K+ yellow (due to the presence of stictic acid), lobes that are scrobiculate, developing into a network of raised ridges and shallow depressions, with roundish soralia developing on the ridges, lobe tips that often develop a thin layer of whitish pruina, and brown undersides becoming black towards the centre (Brodo et al. 2001, Harris & Ladd 2005; both as *Canoparmelia crozalsiana* (B. de Lesd. ex Harm.) Elix & Hale). It belongs to a group of species that were segregated from the genus *Canoparmelia* which differs in having a smooth, rather than a scrobiculate upper surface (Lendemer & Hodkinson 2012).

Specimens examined. – **CANADA. ONTARIO.** CHATHAM-KENT CO.: Clear Creek Forest Provincial Park, 14 km ENE of Ridgetown, deciduous thicket with *Crataegus* spp., *Cornus drummondii*, and *Juglans nigra*, 22.x.2024, corticolous on bark of *Crataegus* sp., *S.R. Brinker 10917* (hb. Brinker). ELGIN CO.: John. E. Pearce Provincial Park, 22 km ESE of Port Stanley, disturbed woods with *J. nigra*, *Robinia pseudoacacia* and *Picea abies*, 3.viii.2023, corticolous on bark of *P. abies*, *S.R. Brinker 10103* (CANL). ESSEX CO.: Lake Erie, Pelee Island, Florian Diamante Nature Reserve W of Middle Point, regenerating shallow-soiled over limestone thicket with *C. drummondii*, *Zanthoxylum americanum*, *Crataegus* spp. and *J. nigra*, 16.iv.2024, corticolous on bark of *Crataegus* sp., *S.R. Brinker 10412 & C. Robillard* (CANL); Lake Erie, S end of Pelee Island W of Mill Point, alvar savannah with *Quercus muehlenbergii*, *Fraxinus quadrangulata* and *Juniperus virginiana* 18.iv.2024, corticolous on bark of *Crataegus* sp., *S.R. Brinker 10453 & C. Robillard* (CANL); Bickford Oak Woods Conservation Reserve, 20 km S of Sarnia, lowland clay plain deciduous forest with vernal pools ringed with *Quercus bicolor* and *Acer saccharinum*, 19.iv.2024, corticolous on bark of *A. saccharinum, S.R. Brinker 10456* (CANL); Lasalle, Brunet Park S of Windsor, manicured parkland with scattered trees and remnant deciduous woodlots, 20.ix.2024, corticolous on bark of *Quercus rubra*, *S.R. Brinker 10780* (CANL); Cedar Creek Provincial Park, 6.5 km E of Harrow, 4.5 km N of Lake Erie, along creek valley in deciduous scrubby woods, 20.ix.2024, corticolous on bark of *Q. rubra*, *S.R. Brinker 10785* (CANL); Rondeau Provincial Park, S shore of Lake Erie S of Morpeth, soft maple deciduous swamp with *Ulmus americana*, 25.x.2024, corticolous on bark of *Acer* sp., *S.R. Brinker 10966* (photographic voucher, Fig. 9B; CANL). LAMBTON CO.: Reid Conservation Area, 8.7 km N of Wallaceburg along North Sydenham River, edge of marshy vernal pond with pockets of *Cephalanthus occidentalis* and upland *Quercus* spp. deciduous woods, 10.xi.2022, corticolous on bark of *Crataegus* sp., *S.R. Brinker 9697* (CANL); McKellar Wildlife Area, 20 km NNE of Wallaceburg, 14.5 km W of Oil Springs, lowland deciduous forest on clay plain with *A.* ×*freemanii* and *Quercus* spp., 11.xi.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9701* (CANL). MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, mature deciduous swamp with *A.* ×*freemanii*, *U. americana* and *Lindera benzoin*, 8.xi.2022, corticolous on bark of *A.* ×*freemanii, S.R. Brinker 9670* (hb. Brinker). NORFOLK CO.: Backus Woods Natural Area, 12 km W of Turkey Point, 4 km N of Port Rowan, successional woods with occasional openings in *J. nigra* and mixed

conifer plantation, 24.ix.2022, ramicolous on twigs of *P. glauca*, *S.R. Brinker 9595* (hb. Brinker); Courtland Swamp 10 km SE of Tillsonburg, 7 km W of Lynedoch, deciduous swamp with *A.* ×*freemanii*, *U. americana*, and *L. benzoin*, 22.v.2025, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 11101* (CANL).

***Dermatocarpon dolomiticum* Amtoft**

FIGURE 6E.

DISCUSSION. – *Dermatocarpon dolomiticum* is a species of calcareous rock, particularly unbroken exposures of dolostone (Amtoft et al. 2008). It ranges from Oklahoma east to New York State and north to Ontario (Amtoft et al. 2008), Québec (*Brodo 29708b*, CANL) and Saskatchewan (Rudy 2020). In Ontario, it has been reported from alvars on the upper Bruce and Penetanguishene Peninsulas, Manitoulin Island, the Napanee Limestone Plain and the Smith Falls Limestone Plain (Brinker 2020, Brodo et al. 2013, McMullin & Lendemer 2016). The record cited below fills an important provincial distributional gap to include the Lake Erie Island Archipelago alvars. The species is rare in Canada and is listed as a priority COSEWIC (2025) candidate species in need of a status assessment. *Dermatocarpon dolomiticum* most closely resembles *D. muhlenbergii* (Ach.) Müll. Arg. in Ontario, and both can grow in the same habitat, though the thallus lobes of that species are more often entire rather than deeply dissected, the thallus is usually brown to blue-green not brown-black, and with larger perithecia (420–600 × 355–565 µm vs. 162–320 × 130–360 µm in *D. dolomiticum*; fide Amtoft et al. 2008).

Specimen examined. – **CANADA. ONTARIO.** ESSEX CO.: Lake Erie, S end of Pelee Island W of Mill Point, Stone Road Alvar complex, treed alvar savannah with scattered *Quercus muehlenbergii*, *Juniperus virginiana* and *Cornus drummondii*, 18.iv.2024, saxicolous on exposed limestone pavement, *S.R. Brinker 10450 & C. Robillard* (CANL).

***#*Didymosphaeria oblitescens* (Berk. & Broome) Fuckel**

FIGURE 6F.

DISCUSSION. – *Didymosphaeria oblitescens* is a non-lichenized pyrenocarpous ascomycete that is sometimes studied by lichenologists. It is a cosmopolitan species occurring widely in eastern, central and western North America (Aptroot 1995, Hayova & Minter 2011). In Canada it was mentioned as being present in British Columbia and Ontario by Hayova and Minter (2011) but those authors did not provide supporting specimen citations. A search of GBIF (2025) resulted in a single Ontario collection from 1965 (*Brodo 6021*, DAOM) from the Thunder Bay District. The collection cited below appears to be the first report from Ontario in over 60 years and fills a large distributional gap to include the Carolinian Zone. Substrate preference varies across its range, with records from eastern North America having been reported on the bark of hickory (e.g., Harris & Ladd 2005). Here, it shared this ecology, occurring on flaking bark plates of Shagbark Hickory (*Carya ovata*). It can be recognized by its ecology, lack of a lichenized thallus, small black semi-immersed perithecia, and 2-celled, brown ascospores measuring 13–19 × 5–7 µm (Harris & Ladd 2005). Ascospores in the material cited below agreed with these sizes, ranging from 13.1–15.3 × 6.3–7.3 µm.

Specimen examined. – **CANADA. ONTARIO.** ESSEX CO.: Lake Erie, Pelee Island, Florian Diamante Nature Reserve, treed alvar savannah with *Quercus muehlenbergii*, *Fraxinus quadrangulata*, and *Carya ovata*, 12.xi.2024, corticolous on peeling *C. ovata* bark flakes, *S.R. Brinker 11003* (CANL).

***Evernia prunastri* (L.) Ach.**

FIGURE 7A.

DISCUSSION. – *Evernia prunastri* is a mainly western taxon in North America that is widespread in boreal and temperate regions from Alaska south to California, extending inland to the Rocky Mountains (Bird 1974). It is disjunct in eastern North America where it occurs very locally in the Great Lakes Basin, the maritime provinces of Canada, and New England (Brodo et al. 2001, Hinds & Hinds 2007). It was thought to be regionally extinct from the Great Lakes region due to a lack of contemporary records (Brodo et al. 2001). However, recent fieldwork in southern Ontario has shown it to be present in several regions where it is associated with large, humid inland deciduous and mixed swamps and forested coastal areas of Lake Huron and Georgian Bay (Brodo et al. 2013, Lewis & Brinker 2017, McMullin et al. 2014). These additional records document its presence for the first time in Ontario on non-native ornamental trees and shrubs in urban areas where the species would not be expected, due to its sensitivity to eutrophication and sulfur dioxide levels (Lackovičová et al. 2013, Loppi & Frati 2006).

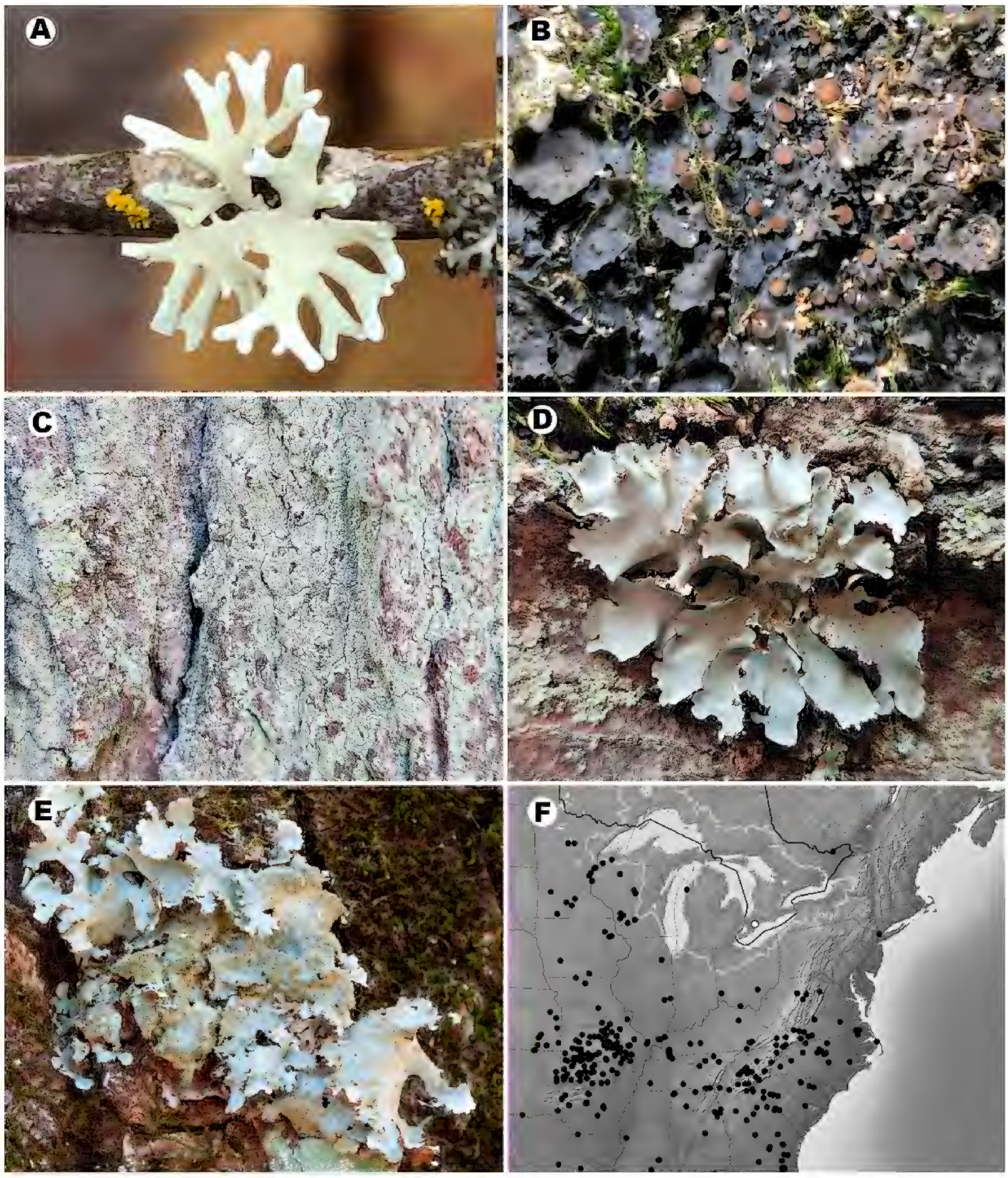

Figure 7. Photographs and distribution maps of lichens rarely reported from Ontario (white = newly reported Ontario records, black = previous collections). **A,** *Evernia prunastri* on twig of ornamental *Acer palmatum* var. *dissectum* (photo taken in situ, scale not included, *Brinker 7529*). **B,** *Leptogium rivulare* (photo taken in situ, scale not included, *Brinker 8791*). **C,** *Lepraria hodkinsoniana* on bark of *Quercus bicolor* (*Brinker 10956*). **D,** *Parmotrema stuppeum* (photo taken in situ, scale not included, *Brinker 10938*). **E,** *Parmotrema subtinctorium* (photo taken in situ, *Brinker 9687*). **F,** distribution of *P. subtinctorium* in eastern North America.

Specimens examined. – **CANADA. ONTARIO.** YORK CO.: Markham, former (now shuttered) Sheridan Nursery along Hwy 7, on trunks of several retail nursery stock imported from Oregon, USA, 25.v.2019, corticolous on bark and ramicolous on twigs of *Acer palmatum* var. *dissectum*, *S.R. Brinker 7529* (CANL); City of Markham E of McCowan Rd., extensive urban area with subdivisions, manicured parks and landscaped trees, 26.iv.2024, corticolous on bark of ornamental *Gleditsia triacanthos* var. *inermis*, *S.R. Brinker 10469* (CANL).

***Lepraria hodkinsoniana* Lendemer**

FIGURE 7C.

DISCUSSION. – *Lepraria hodkinsoniana* is restricted to eastern North America where it is mainly corticolous on the bark of broadleaved trees, particularly maple and oak (Lendemer 2013), though it also infrequently occurs on conifers and non-calcareous rock in habitats with high humidity (Lendemer 2011b). During the present study it was collected on the bark of Swamp White Oak (*Quercus bicolor*). One previous report from the province exists though it was on spruce (*Picea*) bark (Lendemer 2013). The species is characterized by the presence of divaricatic acid and zeorin and is only one of two *Lepraria* species in eastern North America that produce divaricatic acid (Lendemer 2011b). The other species, *L. cryophila* Lendemer, differs in its ecology, occurring on non-calcareous rocks in microhabitats with high humidity, in having a conspicuous hypothallus with pale rhizohyphae and ascending thallus margins, and in the production of nordivaricatic acid in addition to divaricatic acid, and a lack of zeorin (Lendemer 2011b).

Specimen examined. – **CANADA. ONTARIO.** MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17 km NE of Thamesville, deciduous swamp with *Acer* ×*freemanii*, *Ulmus americana* and *Lindera benzoin*, 24.x.2024, corticolous on bark of large *Quercus bicolor*, *S.R. Brinker 10956* (NYS, hb. Brinker; det. J. Lendemer).

***Leptogium rivulare* (Ach.) Mont.**

FIGURE 7B.

DISCUSSION. – *Leptogium rivulare* is included here because of its current conservation status. The presence of the species on the Global Fungal Red List is based on its International Union Conservation of Nature (IUCN) status of Near Threatened (Randlane 2015). It is a boreal-temperate cyanolichen found primarily in glaciated portions of eastern North America and eastern, central, and western Europe, mainly between the 45°N and 60°N parallels (COSEWIC 2015). It has a distinctive ecology, growing on periodically inundated tree trunks or rarely rock in humid swamp forests or along seasonally flooded swamps along alkaline waterbodies. Previous records from Ontario are from the Great Lakes St. Lawrence Forest and southern Boreal Forest ecoregions (COSEWIC 2015). The collections cited below from four new counties are the first from the Deciduous Forest ecoregion. Ongoing surveys for this species in Ontario by the author and colleagues (e.g., COSEWIC 2015, Brinker 2020, Brinker published data) have led to many new locations and discoveries of numerous sizeable subpopulations with thousands of individuals. However, two collections from the study area were made on the bark of dead ash trees infected by Emerald Ash Borer. Ashes have been decimated in the region by the spread of the invasive Emerald Ash Borer, a jewel beetle native to north-eastern Asia that feeds on ash trees first discovered in the Carolinian Zone as early as 2002 (Herms & McCullough 2013) and has subsequently eliminated essentially all mature ash species associated with the preferred swamp habitat of *L. rivulare* in this region (i.e., *Fraxinus nigra*, *F. pennsylvanica* and *F. profunda*) (COSEWIC 2022, S. Brinker unpublished data). As a result, *L. rivulare* has likely endured undocumented declines in the Carolinian Zone due to the near-elimination of suitable phorophytes. These data suggest a need to revise the IUCN status as there is both evidence that it is more widespread and common than previously believed, but there are new threats associated with the decline of an important host substrate.

Specimens examined. – **CANADA. ONTARIO.** ESSEX CO.: Bickford Oak Woods Conservation Reserve, 20 km S of Sarnia, lowland clay plain deciduous forest with vernal pools ringed with *Quercus bicolor* and *Acer saccharinum*, 19.iv.2024, corticolous on bark of *Q. bicolor, S.R. Brinker 10457* (CANL). LAMBTON CO.: McKellar Wildlife Area, 20 km NNE of Wallaceburg, 14.5 km W of Oil Springs, forested vernal pond with scattered *A.* ×*freemanii* in clay plain *Quercus* spp. dominated deciduous forest, 11.xi.2022, corticolous on flooded bole of *A.* ×*freemanii*, *S.R. Brinker 9698* (CANL). MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, deciduous swamp with *A.* ×*freemanii*,

Ulmus americana and *Cephalanthus occidentalis*, 24.x.2024, corticolous on bark of young *Fraxinus* sp., *S.R. Brinker 10952* (CANL). NORFOLK CO.: Cultus Forest, 14.5 km WNW of Port Rowan, 4.5 km SE of Frogmore, deciduous swamp in large vernal pond with *A.* ×*freemanii* and *U. americana* in sandy deciduous forest, 16.vi.2021, corticolous on bark of *F. pennsylvanica*, *S.R. Brinker 8791* (CANL).

***Parmotrema stuppeum* (Taylor) Hale**

FIGURE 7D.

DISCUSSION. – *Parmotrema stuppeum* has an Appalachian Great Lakes distribution in eastern North America where it occurs on the branches and bark of hardwoods (Brodo et al. 2001). It is not likely to be confused with most other *Parmotrema* species in the Northeast, differing morphologically by its narrow, linear soralia on revolute lobe margins, and a K+ yellow turning red medulla (due to the presence of salazinic acid). *Parmotrema austrosinense*, a species newly reported for Canada in this study, could be mistaken for this species as it also produces linear, marginal soralia on erect, ruffled lobes (Nash III & Elix 2002b). However, *P. austrosinense* differs in having a C+ red and KC+ red medulla (due to the presence of lecanoric acid) and has a broad non-rhizinate marginal zone that is light brown to white, whereas *P. stuppeum* has a marginal zone on the undersides that is shiny brown with sparse marginal cilia on the lobes (Brodo et al. 2001, Nash III & Elix 2002b). In addition to being newly reported for the Carolinian Zone, the collections cited below are the only modern records since its rediscovery in the Algoma District (Brinker 2020).

Specimens examined. – **CANADA. ONTARIO.** MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17 km NE of Thamesville, deciduous swamp with *Acer* ×*freemanii*, *Ulmus americana* and *Lindera benzoin*, 23.x.2024, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 10938* (NYS, det. J. Lendemer). PETERBOROUGH CO.: Crowe River Swamp, 5.5 km ENE of Lasswade, deciduous swamp with *Fraxinus pennsylvanica*, *A.* ×*freemanii* and *Quercus macrocarpa*, 8.ix.2022, corticolous on bark of *F. pennsylvanica*, *S.R. Brinker 9556* (NY, hb. Brinker; conf. J. Lendemer).

***Parmotrema subtinctorium* (Zahlbr.) Hale**

FIGURES 7E & 7F.

DISCUSSION. – *Parmotrema subtinctorium* is widespread in temperate areas of eastern North America, ranging from Wisconsin south to the Ozarks and east to the Appalachian Mountains and the Coastal Plain, and south to Florida, where it occurs on the bark of well-lit deciduous trees (Brodo et al. 2001, as *Canomaculina subtinctoria* (Zahlbr.) Elix). It was reported from Ontario by Wong and Brodo (1990) based on two early collections made by John Macoun from swamps in eastern Ontario. The species was subsequently considered likely extirpated in Canada by Brodo et al. (2021b) due to the lack of any contemporary records despite considerable focus on the lichen biota of the Ottawa region where one of the early collections was made. The population found during the present study reconfirms its presence in Canada after over a century of no records. Its relative scarcity in the study area (only a single thallus was observed at one location) suggests it is a very rare species that has likely declined due to loss of mature swamp forest habitat.

Parmotrema subtinctorium has a foliose thallus that is mineral gray to blue-gray with conspicuous marginal cilia, laminal isidia, a uniformly brown lower surface, and a K+ yellow turning red medulla (due to the presence of salazinic acid) (Tripp & Lendemer 2020). In Ontario, the only other isidiate *Parmotrema* is *P. crinitum* (Ach.) M. Choisy. That species can be easily distinguished by having laminal isidia typically with apical cilia, a black lower surface centrally with a brown marginal zone, and a medulla that is PD+ orange, K+ yellow turning red (containing salazinic acid and norlobaridone) (Brodo et al. 2001, as *C. subtinctoria*; Wong & Brodo 1990).

Specimen examined. – **CANADA. ONTARIO.** MIDDLESEX CO.: Skunks Misery, 60 km SW of London, 17.5 km NE of Thamesville, mature deciduous swamp with *Acer* ×*freemanii*, *Ulmus americana*, *Cephalanthus occidentalis* and *Lindera benzoin*, 9.xi.2022, corticolous on bark of *A.* ×*freemanii*, *S.R. Brinker 9687* (NYS; conf. J. Lendemer).

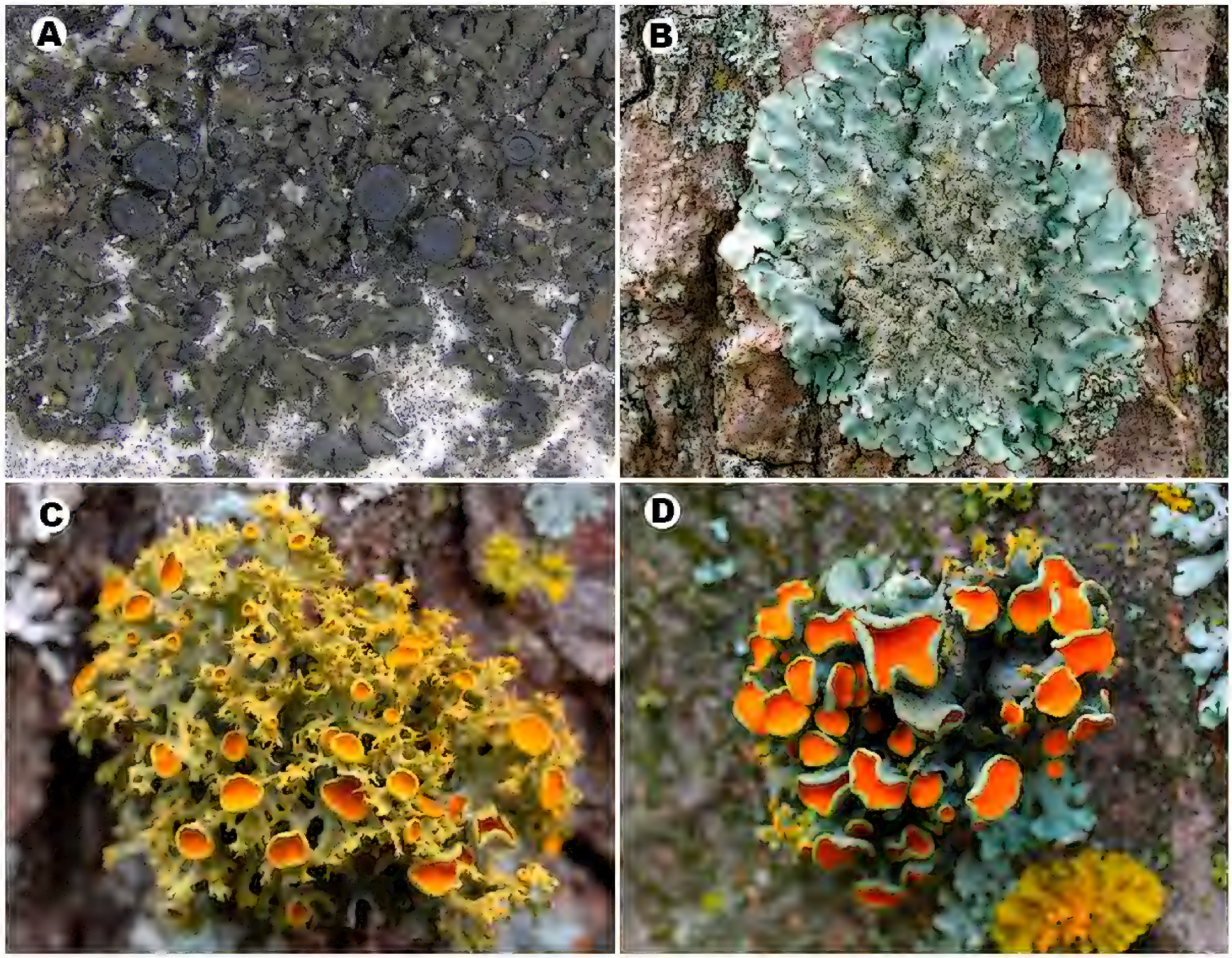

Figure 8. Photographs of lichens rarely reported from Ontario. **A,** *Placynthium petersii* on limestone (photo taken in situ, scale not included, *Brinker 11032*). **B,** *Punctelia borreri* on bark of *Populus deltoides* (photo taken in situ, scale not included, *Brinker 11022*). **C,** *Teloschistes chrysophthalmus* on bark of *P. deltoides* (photo taken in situ, scale not included, *Brinker 10454*). **D,** *Teloschistes chrysophthalmus* on planted ornamental *Acer* sp. (photo taken in situ, scale not included, *Brinker 10465*).

***Placynthium petersii* (Nyl.) Burnham**

FIGURE 8A.

DISCUSSION. – *Placynthium petersii* appears to be an uncommon but occasionally locally abundant species in North America, distributed throughout much of the temperate eastern United States in calcareous rock barrens (Harris & Ladd 2005, Henssen 1963). It has been reported from exposed carbonate bedrock outcrops of dolomite and limestone (e.g. Harris & Ladd 2005, Henssen 1963, LaGreca 2010), and only recently for Ontario from marble and limestone outcrops in eastern Ontario (Brinker 2020). The specimen cited here extends its range south to the Carolinian Zone where it occurred on a shelving limestone bedrock shoreline and is undoubtedly rare in the region due to the scarcity of suitable exposures of calcareous rock outcrops (S. Brinker unpublished data).

In addition to its ecology, it can be recognized by its subfoliose thallus forming rosettes to 4 cm in diameter, flat marginal lobes that often extend radially from the centre measuring 0.2–0.3(–0.6) mm wide, dark undersides, and lacking a black-blue prothallus (Henssen 1963). According to that author, rarely the lobes can be densely imbricately covered by flat isidia. Another identifying feature is the tendency of older thalli to often become ragged and degraded with central dieback, resulting in thalli forming patterns of concentric rings or a large circular patch. *Placynthium petersii* is most likely to be confused with *P. flabellosum* (Tuck.) Zahlbr and *P. stenophyllum* (Tuck.) Fink in Ontario, both which also possess distinct marginal lobes that lack a prothallus (Henssen 1963). Although *P. stenophyllum* can form patches of circular rosettes, these are typically much smaller in size up to 1 cm in diameter, its lobes are narrowly

filiform, convex to cylindrical measuring 0.05–0.1 mm wide, sometimes with cylindrical isidia, and the undersides are pale (Hinds & Hinds 2007). It also prefers calcareous rock outcrops and can grow adjacent to *P. petersii* in Ontario (Brinker, unpublished data). *Placynthium flabellosum* can be distinguished by its ecology, occurring on seasonally wet non-calcareous rock typically below the high-water mark along waterways, and its conspicuous overlapping laminal isidia (Henssen 1963).

Specimen examined. – **CANADA. ONTARIO.** HALDIMAND CO.: Rock Point Provincial Park, 9 km S of Dunnville, shelving Devonian limestone outcrops along shoreline below bluffs and upland deciduous woods, 14.xi.2024, saxicolous on exposed shelving limestone, *S.R. Brinker 11032* (CANL).

***Punctelia borreri* (Sm.) Krog**

FIGURE 8B.

DISCUSSION. – *Punctelia borreri* is a southern-temperate species of well-lit trees found in portions of Africa, Asia, Australia, Europe, as well as North and South America (Egan & Aptroot 2004). It appears to be rather uncommon in eastern North America however, occurring sporadically from Ohio to West Virginia (Brodo et al. 2001). In Canada, the species was reported historically from Ottawa (Macoun 1902, as *Parmelia borreri* Turn.) and listed for the Ottawa region by Brodo (1988) but there are evidently no modern records there despite considerable lichen fieldwork in the region. A specimen collected from the bark of American Elm (*Ulmus americana*) (*Brodo 13283*, CANL) in 1968 cited by Wong and Brodo (1992) appears to be the last record of its presence in Canada. Due to its perceived rarity, *P. borreri* was given a proposed national status of Endangered (Goward et al. 1998) and is presently listed as a priority candidate species in need of a status assessment in Canada (COSEWIC 2025). A search of CLH (2024) produced several additional scattered records across Canada but the species has been consistently misidentified in the past so these should be reexamined. Based on this, the collections cited below appear to be the first verified records of its presence in Canada in almost 60 years, and the first from the Carolinian Zone. During the present study, it was found on the bark of several hardwood trees and deciduous shrubs in open calcareous woods and previously grazed alvar thickets, as well as Great Lakes coastal treed dunes with Eastern Cottonwood. In Ontario, *P. borreri* most closely resembles another corticolous sorediate species of *Punctelia*, *P. caseana* Lendemer & B.P. Hodk. *Punctelia borreri* can be distinguished in the field from that species by having a lower surface which is black centrally, versus pale to off-white or occasionally light brown in *P. caseana* (Lendemer & Hodkinson 2010).

Specimens examined. – **CANADA. ONTARIO.** ESSEX CO.: Pelee Island, Lake Erie, N end of island at Lighthouse Point Provincial Park, edge of sandy woods along shoreline with occasional large *Populus deltoides* and invading *Morus alba*, 16.iv.2024, corticolous on bark of *P. deltoides*, *S.R. Brinker 10400 & C. Robillard* (hb. Brinker); Pelee Island, Lake Erie, N end of island at Lighthouse Point Provincial Park, deciduous thicket over shallow-soiled limestone with *Cornus drummondii*, *M. alba* and *Lonicera maackii*, 13.xi.2024, corticolous on bark of *C. drummondii*, *S.R. Brinker 11022* (CANL); Florian Diamante Nature Reserve, W of Middle Point, deciduous thicket over limestone with *Crataegus* spp., *Juniperus virginiana, Juglans nigra* and *C. drummondii*, 18.iv.2024, corticolous on bark of *J. nigra*, *S.R. Brinker 10440 & C. Robillard* (hb. Brinker). NORFOLK CO.: Long Point National Wildlife Area, outer Long Point 25 km SE of Port Rowan, Lake Erie, *P. deltoides* treed sand dune with *Ammophila breviligulata*, 4.vi.2025, corticolous on bark of *P. deltoides*, *S.R. Brinker 11133* (hb. Brinker).

***Teloschistes chrysophthalmus* (L.) Th. Fr.**

FIGURES 8C & 8D.

DISCUSSION. – *Teloschistes chrysophthalmus* is widespread throughout the interior of continental North America from Texas and Mississippi north to southern Manitoba (Brodo et al. 2001). It is rare in eastern North America and represented by several disjunct subpopulations that are mostly known from historical vouchers and likely extirpated (Brodo et al. 2001, Hinds & Hinds 2007). The species is included here because of its rarity and overall conservation interest, listed as an Endangered species on Schedule 1 of the Canadian Species at Risk Act as a distinct population (as Golden-eye Lichen, Great Lakes population 2, ECCC 2016).

Until now, the only extant population in southern Ontario consisted of several individuals at a single coastal site on Lake Ontario (COSEWIC 2016) within the Great Lakes St. Lawrence Forest region. In the Carolinian Zone, the last record of *T. chrysophthalmus* dated from 1901 (Macoun 1902), despite

recent search effort there (COSEWIC 2016, S. Brinker unpublished data). The author came across a recent observation on iNaturalist by Brent Turcotte (https://www.inaturalist.org/observations/161009661). A subsequent visit to the general location and follow-up discussions with the original observer determined that the single thallus was likely no longer present. It occurred on a fallen tree trunk along the coast of Lake Erie but evidently had over the next year lost its bark likely due to ice scour and wave splash. After completing additional targeted searches, the author found six thalli in several new nearby locations. Interestingly, Pelee Island is only 15 kilometers south of the last location *T. chrysophthalmus* was recorded in the region at Point Pelee (*Macoun 3643*; 1902). This prompted the author to conduct a search at another historic location at Long Point that resulted in the discovery of three additional thalli near another location where John Macoun collected it at Port Rowan in 1892 (*Macoun 529*, CANL). The records cited below represent the first accounts of its presence at two Canadian locations on Lake Erie in over a century. Circumstantial evidence suggests these are naturally occurring individuals since they were found in remnant natural areas with no nearby ornamental plantings and occur in suitable habitat within the historical range of the species.

The author also followed up with another observation documented on iNaturalist made by Dilpreet Moti in 2020 from the Greater Toronto Area (https://www.inaturalist.org/observations/39765725). Returning to the location where it was discovered, 18 thalli were found on the bark of several horticultural soft maples (leaf-off *Acer* sp.) along with several other unusual lichens for the area discussed previously under *Candelaria fibrosa*. Given that these individuals co-occurred on the same commercially planted trees and were otherwise absent from surrounding native and ornamental trees, the occurrence of *T. chrysophthalmus* is almost certainly the result of an introduction linked to importation of ornamental trees from some area further south in the United States. The presence of the species at this location is beyond its known natural range in Canada, since it has never been found so far inland of the Great Lakes. Historical and modern records from southern Ontario are restricted to humid coastal areas of Lakes Erie and Ontario and adjoining Niagara River (COSEWIC 2016). *Teloschistes chrysophthalmus* has been found elsewhere in eastern North America on planted nursery stock (e.g., Frye et al. 2021) and this occurrence appears to be the first documented case of this in Canada.

Specimens examined. – **CANADA. ONTARIO.** ESSEX CO.: Lake Erie, Pelee Island, Lighthouse Point Provincial Park, treed sand dune with *Populus deltoides*, *Cornus drummondii*, *Salix* ×*rubens*, and invading *Phragmites australis* ssp. *australis*, 18.iv.2024, corticolous on bark of *P. deltoides*, *S.R. Brinker 10454* (CANL). NORFOLK CO.: Long Point National Wildlife Area, outer Long Point 23 km SE of Port Rowan, Lake Erie, *P. deltoides* treed sand dune with *Ammophila breviligulata*, 4.vi.2025, corticolous on bark of *P. deltoides*, *S.R. Brinker 11120* (photographic voucher, Fig. 9C; CANL). YORK CO.: City of Markham, E of McCowan Rd., extensive urban area with subdivisions, manicured parks and planted ornamental trees, 24.iv.2024, corticolous on bark of several commercially planted *Acer* sp., *S.R. Brinker 10465* (hb. Brinker).

DISCUSSION

The records reported here represent an important contribution to our knowledge of the lichen flora from the most southerly region of Canada and Ontario. Of the ten species reported as new to Canada or Ontario, seven are conspicuous macrolichens that occur on common bark substrates and therefore appropriate substrate availability is not likely a limiting factor for their distribution here. They appear to be rare in Canada because they are at their northern range limits and reflect a southern element of either a remnant lichen biota that has been overlooked, or possibly an assemblage of lichens benefitting from improvements in air quality and possibly changes in climate. In the Netherlands for example, the recent rapid spread of several warm-temperate lichens such as *Punctelia borreri* and *Flavoparmelia soredians* (Nyl.) Hale was postulated to have been aided by global warming (van Herk et al. 2002).

While it cannot be ruled out that some of the species reported here could be benefitting from occasional novel introductions and possibly spreading as naturalized individuals from planted nursery stock, the restriction of most occurrences to remnant, high-quality natural areas more likely suggests that they are part of a native regional lichen biota that has undergone significant past declines and not received thorough modern survey effort. A study in the Netherlands which revisited imported lichens on planted trees after several years of their discovery found clear differences in their survival. Species introduced within portions of their native range tended to survive beyond five years, while species that were not native

to their introduced location declined or disappeared after five years (Sparrius et al. 2014). Of the lichen species documented here on planted trees, *Crespoa crozalsiana*, *Teloschistes chrysophthalmus* and *T. exilis* are most out of range and would benefit from monitoring to determine whether they are still present in several years. Some of the naturally occurring species highlighted here such as *Canoparmelia texana*, *Parmotrema gardneri* and *P. austrosinense* are more typical of areas to the south of Canada, and for the most part are common and widespread in their main range and can even be found in urban areas. With additional searches, they may eventually be found elsewhere in southern Ontario. On the other hand, *Myelochroa metarevoluta* and *Gyalideopsis moodyae* are globally rare species and their presence in the region presumably represent small, naturally occurring populations. The distribution of two other species, *Dermatocarpon dolomiticum* and *Placynthium petersii*, follow the availability of their typical substrates. Both are restricted to calcareous rock, but these species need specific exposures of extensive areas of calcareous bedrock typically associated with alvars or barrens, which are very rare in the Carolinian Zone.

By far the most interesting habitat examined that supported the most records cited above was that of deciduous swamp forests with seasonal flooding. Overall lichen development in this habitat was observed to range from depauperate in areas with young, even aged replacement stands of soft maples (*Acer saccharinum, A. ×freemanii*) in areas of abandoned land, to among the richest of habitats examined in more mature, uneven aged stands with maple, oak, elm and formerly ash; now decimated by the introduced Emerald Ash Borer with extensive vernal pools, perennially high humidity, and open canopies with high light levels. One natural area in particular, Skunk's Misery, a provincially significant wetland and one of the largest remaining forest complexes in the Carolinian Zone, produced records of 11 of the 21 species cited above, including the largest local population encountered of the globally rare *Myelochroa metarevoluta*, and the first record of *Parmotrema subtinctorium* in over 100 years from Canada. It also contained the most diverse *Parmotrema* communities likely documented in Ontario, supporting five species (*P. gardneri*, *P. hypotropum*, *P. reticulatum*, *P. stuppeum* and *P. subtinctorium*). While Skunk's Misery has long been known as an area with a high diversity of vegetation associations and vascular plants (Larson et al. 1999, Lindsay 1984), it is an overlooked but important refuge for lichen diversity in Ontario, and worthy of further study. At Long Point National Wildlife Area on Lake Erie, a single American larch (*Larix laricina*) swamp was briefly examined and contained four of the species (*H. minarum*, *M. metarevoluta*, *P. austrosinense* and *U. mutabilis*). Unfortunately, past changing Lake Erie water levels here killed many of the mature trees (Reznicek & Catling 1989) and the community, which is rare in the region, is still recovering.

On Pelee Island, open, alvar-like successional thickets regenerating from past disturbances mainly from cattle grazing, and remnant Chinquapin Oak – Blue Ash (*Quercus muehlenbergii – Fraxinus quadrangulata*) alvar habitat with limestone bedrock at or near the surface also supported several new and interesting records. This habitat supported a small population of the Federally Endangered *Teloschistes chrysophthalmus* (Great Lakes population), the majority of observed *Punctelia borreri* individuals, as well as one of the locations of *Parmotrema austrosinense*. The presence of these and other southern species (e.g., *Crespoa crozalsiana*, *Pyxine subcinerea,* and *Punctelia missouriensis*; S. Brinker unpublished data) on Pelee Island, which is part of an archipelago of 22 islands in the western Lake Erie basin straddling the international border of Ontario and Ohio, is perhaps not surprising since it is noted as having a flora more typical of the upper Ohio-Mississippi Valley (Campbell 1976) with numerous plant species found not elsewhere in Canada (e.g., Campbell & Reznicek 1977, Duncan 1973).

Despite the proximity of the Carolinian Zone to several major cities in Canada, the lichens of the region remain inadequately studied. The discoveries highlighted here demonstrate the region contains an important southern lichen element unique in Canada, as well as a novel and changing lichen flora influenced by introductions through the import of ornamental tree nursey stock. The following native taxa documented from the Carolinian Zone appear to represent part of a unique southern element: *Canoparmelia texana*, *Crespoa crozalsiana*, *Hypotrachyna minarum*, *Myelochroa metarevoluta*, *Parmotrema austrosinense*, *P. gardneri*, *Punctelia borreri*, *Pyxine subcinerea* and *Scoliciosporum pensylvanicum*. Interestingly, all of these species except *C. crozalsiana* and *H. minarum* appear to reach the northern limit of their distribution in southern Ontario. The results presented here along with other recent discoveries in the region help begin to fill the gap in our knowledge of the lichen flora of the Carolinian Zone.

Acknowledgements

James Lendemer has been extremely helpful examining specimens I have collected over the years, including several cited here. I thank Sharon Nethercott, Brent Turcotte, Dilpreet Moti for sharing details on their discoveries of *Teloschistes* on the iNaturalist platform. Permits to collect in national wildlife areas, provincial parks and conservation reserves, conservation areas and private nature reserves were provided by Environment and Climate Change Canada (NF-OR-2025-LPNWA-87), Lower Thames Valley Conservation Authority, the Nature Conservancy of Canada (AG-ON-2024-1005407), Ontario Parks, and the Thames Talbot Land Trust. The author is exempt from the prohibitions of section 9 of the Endangered Species Act, 2007 (ESA) while performing regular job duties identifying lichens as an employee of the Ministry of Natural Resources listed as threatened or endangered on the Species at Risk in Ontario List (O. Reg. 230/08 under the ESA). A special thanks to Cassandra Robillard for her companionship during portions of the fieldwork. Finally, thanks to the anonymous reviewers and the editors of *Opsucula Philolichenum*, whose comments and corrections improved the manuscript.

Literature Cited

Allen, G.A., P.F.J. Eagles and S.D. Price (eds.). 1990. *Conserving Carolinian Canada: Conservation Biology in the Deciduous Forest Region*. Waterloo: University of Waterloo Press. 346 pp.

Almborn, O. 1989. Revision of the lichen genus *Teloschistes* in central and southern Africa. Nordic Journal of Botany 8: 521–537.

Amtoft, A. 2002. *Pyxine subcinerea* in the eastern United States. The Bryologist 105: 270–272.

Amtoft, A., F. Lutzoni and J. Miadlikowska. 2008. *Dermatocarpon* (Verrucariaceae) in the Ozark Highlands, North America. The Bryologist 111: 1–40.

Andreas, B.K., R.E. Showman and J.C. Lendemer. 2007. The 2006 combined Crum/Tuckerman workshop in Ohio. Evansia, 24: 55–71.

Aptroot, A. 1995. A monograph of Didymosphaeria. Studies in Mycology 37. 1–160 pp.

Aptroot, A., M. Brand, K. van Herk & L. Sparrius. 2008. Veranderingen in de checklist van de Nederlandse korstmossen en korstmospara-sieten. Buxbaumiella 82: 6–13.

Bird, C.D. 1974. Studies on the lichen genus *Evernia* in North America. Canadian Journal of Botany 52: 2427–2434.

Brinker, S.R. 2020. Contributions to the Ontario flora of lichens and allied fungi, with emphasis on the Great Lakes Basin. Opuscula Philolichenum 19: 58–157.

Brinker, S.R. 2023. Further contributions to the Ontario flora of lichens and allied fungi, with emphasis on the Great Lakes Basin. Opuscula Philolichenum 22: 41–80.

Brodo, I.M. 1988. *Lichens of the Ottawa Region 2nd Edition*. Ottawa Field Naturalists' Club and National Museum of Natural Sciences, Ottawa, Ontario. Special Publication 3. 115 pp.

Brodo, I.M. 2016. *Keys to Lichens of North America Revised and Expanded*. Yale University Press, New Haven. 427 pp.

Brodo, I.M., C. Freebury and F. Brodo. 2021. A maritime lichen finds a home in Ottawa, and it isn't alone. Trail & Landscape 55: 174–182.

Brodo, I.M., R.C. Harris, W. Buck, J.C. Lendemer and C.J. Lewis. 2013. The Lichens of Bruce Peninsula, Ontario: Results from the 17th Tuckerman Workshop, 18-22 Sept. 2008. Opuscula Philolichenum 12: 198–232.

Brodo, I.M., C. Freebury and F. Brodo. 2021a. A maritime lichen finds a home in Ottawa, and it isn't alone. Trail & Landscape 55: 174–182.

Brodo, I.M., R.E. Lee, C. Freebury, P.Y. Wong, C.J. Lewis and R.T. McMullin. 2021b. Additions to the lichens, allied fungi and lichenicolous fungi of the Ottawa Region in Ontario and Quebec, with reflections on a changing biota. Canadian Field Naturalist 135: 1–27.

Brodo, I.M., C. Lewis, and B. Craig. 2007. *Xanthoria parietina*, a coastal lichen, rediscovered in Ontario. Northeastern Naturalist 14: 300–306.

Brodo, I.M., R.T. McMullin and J.P. Ruddy. 2025. The Ottawa lichen list continues to grow: Additions to the lichens and allied fungi from the Ottawa Region. Train & Landscape 59: 32–40.

Brodo, I.M., S.D. Sharnoff and S. Sharnoff. 2001. *Lichens of North America*. Yale University Press, New Haven, CT. 795 pp.

Campbell, C.A. 1976. *Preliminary Ecological Report on Lighthouse Point, Fish Point and East Sister Island Nature Reserves, Essex County, Ontario*. Unpublished report prepared for the Ministry of Natural Resources, Chatham District. 115 pp.

Campbell, C.A. and A.A. Reznicek. 1977. New vascular plant records on Pelee and East Sister Islands, Essex County, Ontario. Canadian Field Naturalist 92: 384–390.

Chapman, L.J. and D.F. Putnam. 1984. *The Physiography of Southern Ontario: Ontario Geological Survey, Special Volume 2*. Ministry of Natural Resources. 270 pp.

Clayden, S.R. 2010. Lichens and allied fungi of the Atlantic Maritime Ecozone. Pp. 153–178 in: D.F. McAlpine and I.M. Smith (eds.). *Assessment of Species Diversity in the Atlantic Maritime Ecozone*. NRC Research Press, Ottawa, Canada.

Consortium of Lichen Herbaria (CLH). 2024. https://lichenportal.org/portal/index.php (Accessed October-December 2024).
COSEWIC. 2015. COSEWIC assessment and status report on the Flooded Jellyskin *Leptogium rivulare* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 48 pp. Available: http://www.registrelep-sararegistry.gc.ca/default_e.cfm (Accessed Sept. 2019).
COSEWIC. 2016. COSEWIC assessment and status report on the Golden-eye Lichen *Teloschistes chrysophthalmus*, Prairie / Boreal population and Great Lakes population, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xv + 50 pp. Available: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/golden-eye-lichen-2016.html (Accessed April 2024).
COSEWIC. 2022. COSEWIC assessment and status report on the Pumpkin Ash *Fraxinus profunda* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 50 pp. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/pumpkin-ash-2022.html (Accessed June 2025).
COSEWIC 2025. COSEWIC (Committee on the Status of Endangered Wildlife in Canada) candidate wildlife species, updated April 2025. https://cosewic.ca/index.php/en/reports/candidate-wildlife-species.html#Lichens (Accessed April 2025).
Crins, W.J., P.A. Gray, P.W.C. Uhlig and M.C. Wester. 2009. *The Ecosystems of Ontario, Part 1: Ecozones and Ecoregions*. Ministry of Natural Resources, Peterborough, Inventory, Monitoring, and Assessment. 76 pp.
Curtis, T.J. 2019. A study of the lichenized, lichenicolous, and allied fungi of northeast Ohio. OBELISK Newsletter of the Ohio Moss and Lichen Association 16: 2–12.
Diederich, P., D. Ertz, D. Van den Broeck, P. van den Boom, M. Brand & E. Sérusiaux. 2009. New or interesting lichens and lichenicolous fungi from Belgium, Luxembourg and northern France. XII. Bulletin de la Société des Naturalistes Luxembourgeois 110: 75–92.
Dietrich, M., M. Bertrand, P. Blaise, J. Brännhage, D. Frey, M. Gabathuler, U. Groner, G. Kaufmann., C. Keller, K. Mark, N. Römer, C. Scheidegger, A. Spinelli, G. von Hirschheydt, M. Vust, M. Westberg, V. Zengerer & S. Züst. 2022. Beiträge zur lichenologischen Erforschung der Schweiz – Folge 4. Meylania 70: 5–22.
Dillman, K.L., T. Ahti, C.R. Björk, P. Clerc, S. Ekman, T. Goward, J. Hafellner, S. Pérez-Ortega, C. Printzen, S. Savič and M. Schultz. 2010. New records, range extensions and nomenclatural innovations for lichens and lichenicolous fungi from Alaska, USA. Herzogia, 25: 177–210.
Doubt, J. and R.T. McMullin. 2016. Status of lichens and bryophytes on Middle Island: declining Carolinian habitat at Canada's southernmost point. Northeastern Naturalist 23: 134–140.
Duncan, T. 1973. Three plant species new to Canada on Pelee Island: *Triosteum angustifolium* L., *Valerianella umbilicata* (Sull.) Wood, and *Valerianella intermedia* Dyal. Canadian Field Naturalist 87: 261–265.
ECCC (Environment and Climate Change Canada). 2016. Golden-eye Lichen (Great Lakes population). Available: https://publications.gc.ca/collections/collection_2022/eccc/En14-468-2016-eng.pdf (Accessed April 2024).
Egan, R.S. and A. Aptroot. 2004. *Punctelia*. Pp. 431–436 in: T.H. Nash III, B.D. Ryan, P. Diederich, C. Gries and F. Bungartz (eds.). *Lichen Flora of the Greater Sonoran Desert Region, Volume 2*. Tempe, Arizona: Lichens Unlimited, Arizona State University. 742 pp.
Environment Canada. 1988. The Potential of Soils and Bedrock to Reduce the Acidity of Atmospheric Deposition in Canada. Environmental Fact Sheet 88-1, Inland Waters and Lands Directorate, Environment Canada, Ottawa, Ontario. 6 pp.
Environment Canada. 2014. *Conserve Ontario's Carolinian Forests: Preserve Songbird Species at Risk*. Canadian Wildlife Service, Gatineau QC. 25 pp.
Esslinger, T.L. 2021. A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada, Version 24. Opuscula Philolichenum 20: 100–394.
Flenniken, D.G. 2004. New records for *Myelochroa metarevoluta* (Asahina) Hale in Ohio. Evansia 21: 37.
Frye, H.A., Z. Muscavitch and B. Goffinet. 2021. Discovery of epiphytic lichens in Connecticut suggests novel introduction and reintroduction via horticultural practices. The Bryologist 124: 191–197.
GBIF (Global Biodiversity Information Facility). 2025. *Didymosphaeria oblitescens* (Berk. & Broome) Fuckel. https://www.gbif.org/species/2619856 (Accessed April 2025).
Gockman, O., S.B. Selva and R.T. McMullin. 2020. Calicioid lichens and fungi of Minnesota, U.S.A.: Including two new species, *Chaenothecopsis jordaniana* and *C. penningtonensis* (Mycocaliciaceae). The Bryologist 123: 235–259.
Goward, T., I.M. Brodo and S.R. Clayden. 1998. *Rare Lichens of Canada. A Review and Provisional Listing*. Committee on the Status of Endangered Wildlife in Canada, Ottawa, Ontario. 74 pp.
Hale, M.E. 1976. A monograph of the lichen genus *Parmelina* Hale (Parmeliaceae). Smithsonian Contributions to Botany 33: 1–60.
Hayova, V.P. and D.W. Minter. 2011. *Didymosphaeria oblitescens*. Descriptions of Fungi and Bacteria 189: 1882.
Hardman, A., M. Russell, D. Stone, E. Heinlen, J. Villella and K. Beck. 2023. Calicioid presence in relation to substrate and tree age in forests of northeast Washington, USA. The Bryologist 126: 367–378.

Harris, R.C. 2009. Four novel lichen taxa in the lichen biota of eastern North America. Opuscula Philolichenum 6: 149–156.
Harris, R.C. and D. Ladd. 2005. *Preliminary Draft: Ozark Lichens. Enumerating the lichens of the Ozark Highlands of Arkansas, Illinois, Kansas, Missouri, and Oklahoma*. Unpublished report. 249 pp.
Henssen, A. 1963. The North American species of *Placynthium*. Canadian Journal of Botany 41: 1687–1724.
Herms, D.A. and D.G. McCullough. 2014. Emerald Ash Borer invasion of North America: History, biology, ecology, impacts, and management. Annual Review of Entomology 59: 13–30.
Hills, G.A. 1959. *A Ready Reference to the Description of the Land of Ontario and its Productivity*. Preliminary Report. Division of Research, Ontario Department of Lands and Forests, Maple, Ontario. 142 pp.
Hinds, J.W. and P.L. Hinds. 2007. *The macrolichens of New England*. Memoirs of the New York Botanical Garden 96: 1–584.
Hodkinson, B.P. 2010. A first assessment of lichen diversity for one of North America's 'biodiversity hotspots' in the southern Appalachians of Virginia. Castanea 75: 126–133.
Jalava, J.V., P.J. Sorrill, J. Henson and K. Brodrib. 2000. *The Big Picture Project: Developing a Natural Heritage Vision for Canada's Southernmost Ecological Region*. Natural Heritage Information Centre, Ontario Ministry of Natural Resources: Peterborough. 13 pp.
Jalava, J.V., M. Kanter and S. Hodgkiss. 2015. Be Part of the Big Picture: Big Picture Report Card Discussion Paper. Carolinian Canada Coalition. 20 pp.
Jørgensen, P.M. 2012. Lichinaceae. Pp. 46–76 in: Nordic Lichen Society. *Nordic Lichen Flora Vol. 3 Cyanolichens*. Göteborg. 224 pp.
Jørgensen, P. M. and J. Motiejūnaitė. 2005. *Lemmopsis pelodes* found in Lithuania. Graphis Scripta 17: 17–19.
Kirika, P.M., T. Lumbsch, E.G. Huéscar, T.S. Quedensley and P.K. Divakar. 2022. *Canoparmelia texana* (Parmeliaceae, Ascomycota) consists of two independent lineages. Lichenologist 54: 245–251.
Klinkenberg, B. 2002. Spatial analysis of the coincidence of rare vascular plants and landforms in the Carolinian zone of Canada: Implications for protection. The Canadian Geographer 46: 194–203.
Knight, T. 2020. *Annotated checklist of the lichens and allied fungi of Halton Region (Ver. 1)*. Published by the author, Terrastory Environmental Consulting Inc. 18 pp.
Lackovičová, A., A. Guttová, M. Bačkor, P. Pišút and I. Pišút. 2013. Response of *Evernia prunastri* to urban environmental conditions in Central Europe after the decrease of air pollution. Lichenologist 45: 89–100.
LaGreca, S. 2010. NYFA field trip recaps Chaumont Barrens. New York Flora Association Quarterly Newsletter 21: 4–5.
Larson, B.M., J.L. Riley, E.A. Snell and H.G. Godschalk. 1999. *The Woodland Heritage of Southern Ontario: A Study of Ecological Change, Distribution and Significance*. Federation of Ontario Naturalists, Don Mills, Ontario. 262 pp.
Lavoie, A., J. Collin, J. Gagnon, S.R. Brinker, I.M. Brodo, C. Roy, F. Anderson, R.T. McMullin and A. Huereca. 2024. Additions to the lichens, allied fungi and lichenicolous fungi of Quebec, with emphasis on the area below the 50th parallel. Opuscula Philolichenum 23: 82–112.
Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. *Ecological Land Classification for Southern Ontario: First Approximation and Its Application*. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.
Lendemer, J. 2007. Contributions to the lichen flora of North Carolina: New and interesting records of lichens and lichenicolous fungi. Evansia 24: 98–102.
Lendemer, J.C. 2009. Contributions to the lichen flora of Pennsylvania: Further new and interesting reports of lichens and lichenicolous fungi. Evansia 26: 131–141.
Lendemer, J. 2010. Contributions to the lichen flora of Pennsylvania - Further new and interesting reports of lichens and lichenicolous fungi. Evansia 27: 47–64.
Lendemer, J.C. 2011a. A review of the morphologically similar species *Fuscidea pusilla* and *Ropalospora viridis* in eastern North America. Opuscula Philolichenum 9: 11–20.
Lendemer, J.C. 2011b. A taxonomic revision of the North American species of *Lepraria* s.l. that produce divaricatic acid, with notes on the type species of the genus *L. incana*. Mycologia 103: 1216–1229.
Lendemer, J.C. 2013. A monograph of the crustose members of the genus *Lepraria* Ach. s. str. (Stereocaulaceae, Lichenized Ascomycetes) in North America north of Mexico. Opuscula Philolichenum 11: 27–141.
Lendemer, J. 2017. New and interesting records of lichens and lichenicolous fungi from Ohio. Obelisk 14:9–16.
Lendemer, J.C. and B.P. Hodkinson. 2010. A new perspective on *Punctelia subrudecta* (Parmeliaceae) in North America: previously rejected morphological characters corroborate molecular phylogenetic evidence and provide insight into an old problem. Lichenologist 42: 405–421.
Lendemer, J.C. and B.P. Hodkinson. 2012. Recognition of the *Parmelia crozalsiana* group as the genus *Crespoa*. North American Fungi 7: 1–5.
Lendemer, J.C. and R. Lücking. 2004. *Gyalideopsis moodyae* (Ostropales: Gomphillaceae), a New Lichen Species from Eastern North America. The Bryologist 107: 234–236.

Lendemer, J.C. and N. Noell. 2018. Delmarva Lichens: An illustrated manual. Memoirs of the Torrey Botanical Society 28: 1–386.
Lendemer, J.C. and J.L. Allen. 2020. A revision of *Hypotrachyna* subgenus *Parmelinopsis* (Parmeliaceae) in eastern North America. The Bryologist 123: 265–332.
Lewis, C.J. 2014. Notes on new and interesting cyanolichens from Ontario, Canada. Opuscula Philolichenum 13: 34–43.
Lewis, C.J. and S.R. Brinker. 2017. Notes on new and interesting lichens from Ontario, Canada – III. Opuscula Philolichenum 16: 153–187.
Lewis, C.J., I. Brodo and T. McMullin. 2023. *Checklist of lichens of Algonquin Provincial Park*. The Friends of Algonquin Park, Whitney, Ontario.
Lindsay, K.M. 1984. Life Science Areas of Natural and Scientific Interest in Site District 7-2 West of the Haldimand Clay Plain. Parks and Recreational Areas Section, Ontario Ministry of Natural Resources, Central Region, Richmond Hill, Ontario and Southwestern Region, London, Ontario. viii + 131 pp. + folded map, illus.
Line, J.M., M.J. Austen, M.J. Oldham and P.J. Sorrill. 1999. Representation and conservation of rare plants in Ontario's Carolinian Zone Provincial and National Parks. Pp. 353–369 in: N. Pollock-Elland, K. Van Osch and J.G. Nelson with T. Beechey, W. Stephenson and J. Marsh. *Parks and Protected Areas Research in Ontario 1999: Proceedings of the Parks Research Forum of Ontario (PRFO) Annual General Meeting April 22 and 23, 1999*. Guelph, Ontario.
Loppi, S. and L. Frati. 2006. Lichen diversity and lichen transplants as monitors of air pollution in a rural area of central Italy. Environmental Monitoring and Assessment 114: 361–375.
Lücking, R., W.R. Buck and E.R. Plata. 2007. The lichen family Gomphillaceae (Ostropales) in eastern North America, with notes on hyphophore development in *Gomphillus* and *Gyalideopsis*. The Bryologist 110: 622–672.
Macoun, J. 1902. Catalogue of Canadian Plants Part VII. Lichens and Hepaticae. Geological Survey of Canada, Ottawa: Government Printing Bureau. 180 pp.
Maloles, J.R., R.T. McMullin, J.A. Consiglio, C.J. Chapmam, L.L. Riederer, and D.E. Renfrew. 2018. The lichens and allied fungi of the Credit River Watershed, Ontario Canada. Rhodora 120: 229–253.
Maycock, P.F. 1963. The phytosociology of the deciduous forests of extreme southern Ontario. Canadian Journal of Botany 41: 379–438.
McCune, B. 2017. *Microlichens of the Pacific Northwest. Volume 2: keys to the species*. Wild Blueberry Media, Corvallis, OR, U.S.A. iv + 755 pp.
McMullin, R.T., L.L. Bennett, O.J. Bjorgan, D.A. Bourque, C.J. Burke, M.A. Clarke, M.K. Gutgesell, P.L. Krawiec, R. Malyon, A. Mantione and A.T. Piotrowski. 2016. Relationships between air pollution, population density, and lichen biodiversity in the Niagara Escarpment World Biosphere Reserve. Lichenologist 48: 593–605.
McMullin, R.T., C. Cadranel, K.H.I. Drotos, J.R. Maloles, J.T. Skuza and C.A. Wegenschimmel. 2022. Lichens and Allied Fungi of Rouge National Urban Park in the Greater Toronto Area, Ontario. Urban Naturalist 55: 1–19.
McMullin, R.T., H.R. Dorval, L.J. Gillespie, T.L. Knight, J.C. Lendemer, J.R. Maloles and P.C. Sokoloff. 2021. New and interesting Canadian lichens and allied fungi III: Reports from Newfoundland and Labrador, Nova Scotia, Nunavut, Prince Edward Island, Ontario, and Quebec. Opuscula Philolichenum 20: 7–18.
McMullin, R.T., K. Drotos, D. Ireland and H. Dorval. 2018a. Diversity and conservation status of lichens and allied fungi in the Greater Toronto Area: results from four years of the Ontario BioBlitz. Canadian Field-Naturalist 132: 394–406.
McMullin, R.T. and J.C. Lendemer. 2016. Lichens and allied fungi of Awenda Provincial Park, Ontario: diversity and conservation status. American Midland Naturalist 176: 1–19.
McMullin, R.T., J.R. Maloles and S.G. Newmaster. 2015. New and interesting lichens from Ontario, Canada – II. Opuscula Philolichenum 14: 93–108.
McMullin, R.T., J.R. Maloles, C. Earley and S.G. Newmaster. 2014. The Arboretum at the University of Guelph, Ontario: An urban refuge for lichen biodiversity. North America Fungi 9: 1–16.
McMullin, R.T., J.R. Maloles, S.B. Selva & S.G. Newmaster. 2018b. A synopsis of *Chaenotheca* in North America, including a new species from southern Ontario, *C. selvae*, supported by morphometric analyses. Botany 96: 547–553.
Mitchell, E. and V. Simkovic. 2024. Japanese Barberry (*Berberis thunbergii*): Best Management Practices in Ontario. Ontario Invasive Plant Council.
Motiejūnaitė J., 2012: New data on distribution of *Lemmopsis pelodes* in Lithuania [Nauji duomenys apie *Lemmopsis pelodes* paplitimą Lietuvoje]. Botanica Lithuanica 18: 166–168.
Muir, G., E.R. Lawrence, J.W.A. Grant and D.J. Fraser. 2021. Assessing biodiversity hotspots below species-level in Canada using designatable units. Global Ecology and Conservation 26: 1–13.
Nash III, T.H. and J.A. Elix. 2002a. *Canoparmelia*. Pp. 122–125 in: T.H. Nash III, B.D. Ryan, C. Gries and F. Bugartz (eds.). *Lichen Flora of the Greater Sonoran Desert Region, Volume 1*. Lichens Unlimited, Tempe, Arizona. 532 pp.
Nash III, T.H. and J.A. Elix. 2002b. *Parmotrema*. Pp. 318–329 in: T.H. Nash III, B.D. Ryan, C. Gries and F. Bugartz (eds.). *Lichen Flora of the Greater Sonoran Desert Region, Volume 1*. Lichens Unlimited, Tempe, Arizona. 532 pp.

NatureServe. 2024. NatureServe Explorer. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.126164/Myelochroa_metarevoluta (Accessed Oct. 2024).
Oldham, M.J. 2017. List of vascular plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, Ontario.
Olszewski, R. 2010. Lichens and bryophytes of Niagara Region. Natural Heritage Areas Inventory. Niagara Peninsula Conservation Authority. 16 pp.
Ontario Ministry of Finance. 2023. Ontario population projections, 2023–2051. https://www.ontario.ca/page/ontario-population-projections#foot-1 (Accessed January 2025).
Paquette, H.A., Gates, K. and McMullin, R.T., 2020. *Chaenothecopsis ochroleuca*, *Haematomma ochroleucum*, and *Multiclavula vernalis* reported for the first time from Maine. Northeastern Naturalist 27: 34–39.
Printzen, C. and T. Tønsberg. 2004. New and interesting *Biatora*-species, mainly from North America. Acta Universitatis Upsaliensis Symbolae Botanicae 34: 343–357.
Pykälä, J. 2007: Additions to the lichen flora of Finland. II. calcareous rocks and associated soils in Lohja. Graphis Scripta 19: 17–32.
Randlane, T. 2015. *Leptogium rivulare*. The IUCN Red List of Threatened Species 2015: e.T71598929A71599036. http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T71598929A71599036.en.
Reznicek, A.A. and P.M. Catling. 1989. Flora of Long Point, Regional Municipality of Haldimand-Norfolk, Ontario. Michigan Botanist 28: 99–175.
Rowe, J.S. 1972. Forest Regions of Canada. Canadian Forestry Service Publication 1300, Department of Environment, Ottawa, Ontario. 172 pp.
Rudy, M.A. 2020. Saskatchewan's First Alvar Habitats. SK Ministry of Environment Fish, Wildlife, and Lands Branch. Biodiversity Conservation Programs Information Base (2020-BCP-01).
Seaward, M.R., D.H. Richardson, I.M. Brodo, R.C. Harris and D.L. Hawksworth. 2017. Checklist of lichen-forming, lichenicolous and allied fungi of Eagle Hill and its vicinity, Maine. Northeastern Naturalist 24: 349–379.
Selva, S.B. and L. Tibell. 1999. Lichenized and non-lichenized calicioid fungi from North America. The Bryologist 102: 377–397.
Selva, S.B., R.T. McMullin, P. Bell-Doyon, B. Henderson, and E. Lay. 2023. Calicioid lichens and fungi in North America: Species new to science, reported as new from elsewhere and placed into synonymy. The Bryologist 126: 427–446.
Silander, J.A. and D.M. Klepeis. 1999. The invasion ecology of Japanese barberry (*Berberis thunbergii*) in the New England landscape. Biological Invasions 1: 189–201.
Soper, J.H. 1955. Some families of restricted range in the Carolinian flora of Ontario. Transactions of the Royal Canadian Institute 31:69–90.
Sparrius, L.B., A. Aptroot, H.J. Timmerman and W.J. Toetenel. 2014. De overleving van aangevoerde korstmossen. Buxbaumiella 99: 25–31.
Stein, B. 1879. Flechten. In: F. Cohn. Kryptogamen-Flora von Schlesien 2: 1–400. Breslau: Kern.
Stewart, W.G. 1976. A cryptogamic flora of Elgin County, Ontario. Part 1: Mosses, liverworts and lichens. Ontario Field Biologist 30: 17–41.
Thiers, B.M. 2022. Index Herbariorum. http://sweetgum.nybg.org/science/ih/ (Accessed Jun 2024).
Thomson, J.W. 2003. *Lichens of Wisconsin*. Wisconsin State Herbarium, University of Wisconsin-Madison. 386 pp.
Tønsberg, T. 2002. Additions to the lichen flora of North America XI. The Bryologist 105: 122–125.
Tripp, E.A. and Lendemer, J.C. 2020. *Field Guide to the Lichens of Great Smoky Mountains National Park*. University of Tennessee Press, Knoxville. 569 pp.
van Herk, C.M., A. Aptroot and H.F. van Dobben. 2002. Long-term monitoring in the Netherlands suggests that lichens respond to global warming. Lichenologist 34: 141–154.
Waters, D.P. and J.C. Lendemer. 2019. The lichens and allied fungi of Mercer County, New Jersey. Opuscula Philolichenum 18: 17–51.
Wong, P.Y. and I.M. Brodo. 1990. Significant records from the lichen flora of southern Ontario, Canada. The Bryologist 93: 357–367.
Wong, P.Y. and I.M. Brodo. 1992. The lichens of southern Ontario. Syllogeus 69: 1–79.

APPENDIX – SUPPLEMENTARY PHOTOGRAPHIC VOUCHERS OF OCCURRENCES CITED IN TEXT

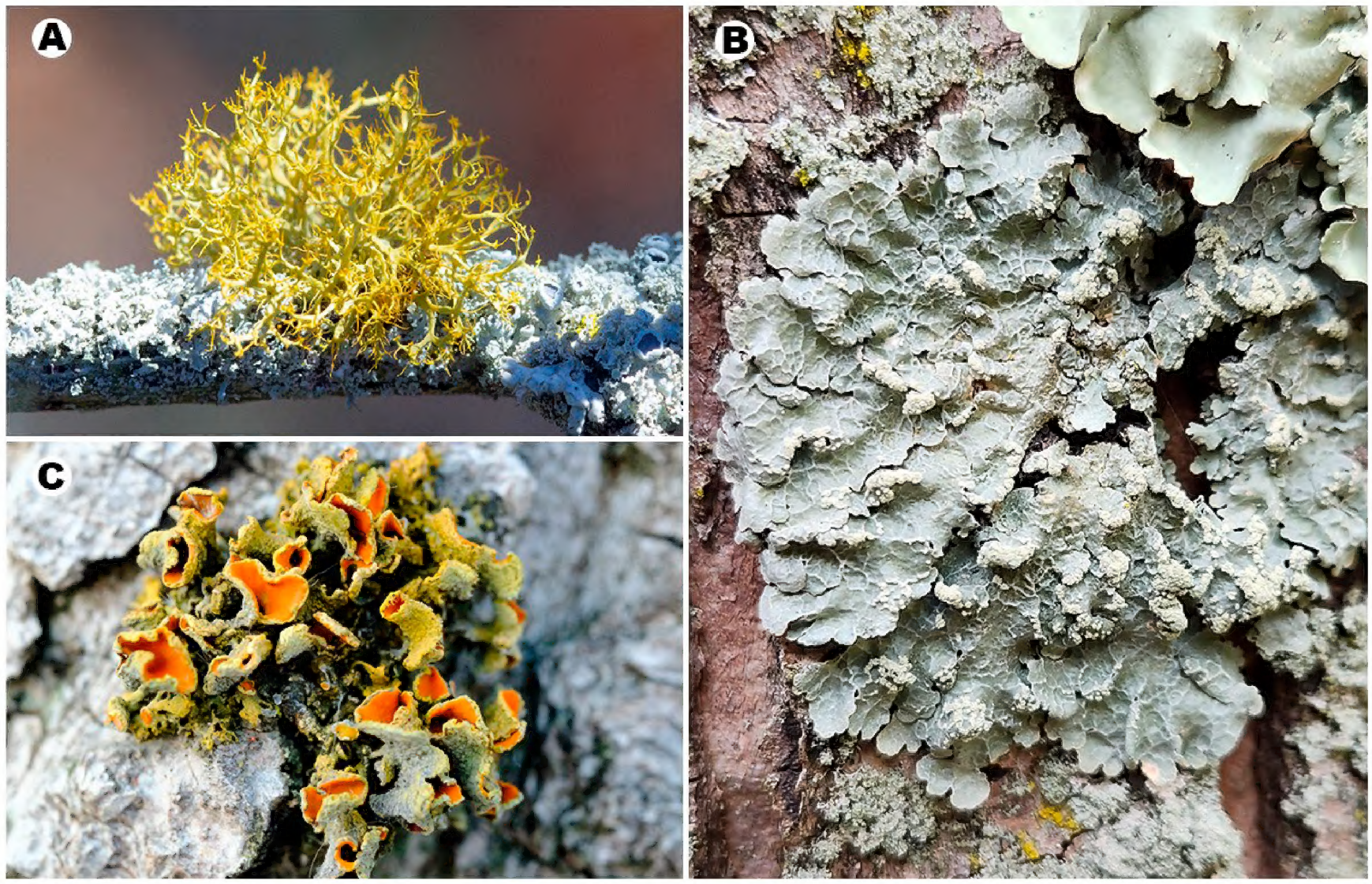

Figure 9. Photographs of lichens included in citations documented with in situ photographic vouchers only (scales not included). **A,** *Teloschistes exilis* (*Brinker 10464*). **B,** *Crespoa crozalsiana* (*Brinker 10966)* **C,** *Teloschistes chrysophthalma* (*Brinker 11120*).